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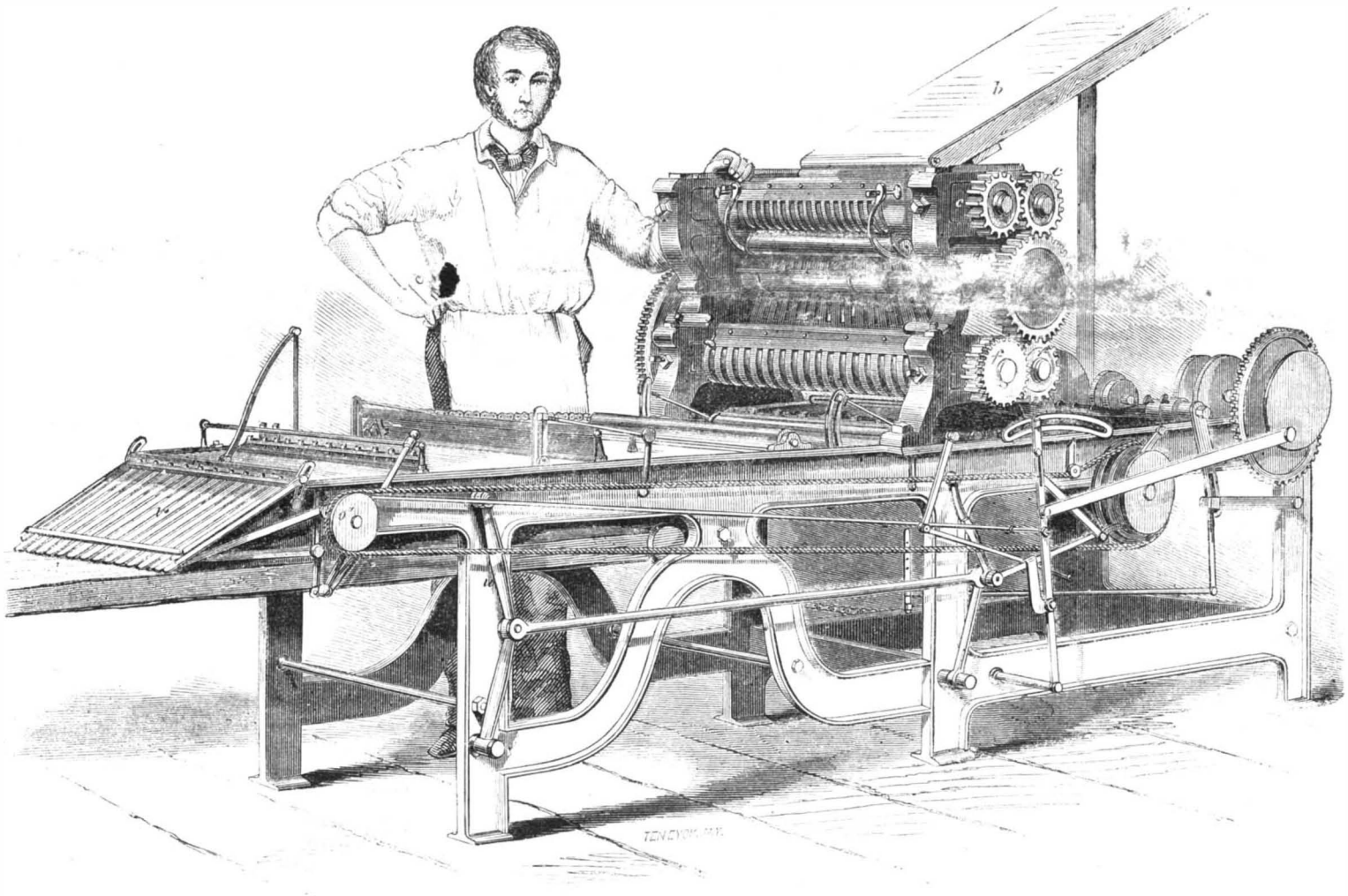
VOL. II.—No. 24. NEW YORK, JUNE 9, 1860. NEW SERIES.

THE "EXCELSIOR" CRACKER MACHINE.

One of the best known articles in market is the "Fox Cracker" manufactured on a very large scale at Lansingburgh, N. Y. The business has been established nearly half a century, and is now in the hands of Jos. Fox, the son of the late founder. Fox's crackers have proved so popular, and have met with such extensive demand in the community, that it has been found very desirable to introduce machinery in their manufacture; but this has not proved an easy task, on account of a difficulty which was not at first anticipated. When crackers are made by hand, they are smoothed and polished on the outside, giving them that glazed crust which confines the gases when they are baked, and makes the interior uniformly light and porous. It is the production of this polished surface which has proved the great obstacle to the success of the inventors of cracker machines, an obstacle which is completely overcome in the great machine here illustrated.

Though the engraving may give the impression that this machine is quite complicated, its principal parts and its operation are perfectly simple, and will be readily understood by the following lucid description:—

The dough, previously rolled into a sheet, is placed upon an inclined table, *b*, the bed of which is formed of rollers. As the dough slides down the table, it enters between a pair of fluted rollers, *c c*, which divide it and press it into a series of cylindrical ropes. These cylinders of dough are conducted by a series of diverging guides, *e*, to the grooves of a second pair of fluted rollers, *f f*, which are longer and have their grooves smaller and farther apart than the first pair. The pressure of this second pair of rollers reduces the size of the strings of dough and polishes their surfaces. As they leave the second pair of rollers they enter a series of tunnel-shaped holes in a plate below, and pass through this plate a sufficient distance to furnish the proper quantity of dough on the end of each, below the plate, when their descent is stopped; the motion of the rollers, *c c*, and *f f*, being intermittent for this purpose. As soon as the descent of the cylinders of dough is stopped, they are seized by a pair of jaws having grooves in their edges which hold the dough while it is being cut. A very thin-bladed knife is now darted forward by a spring which cuts the dough off smooth at the lower surface of the tunneled plate. Below the jaws which now hold the short cylinders of dough in their grooves, is an endless apron or wide belt which stretches across the machine and is carried over the roller, O^2, at its end. Beneath the belt is a flat plate or bar which rises while the knife is still advanced, and presses the pieces of dough between the apron and the knife, molding them in the grooves of the jaws. As the knife retires, a thin plate with a square edge which fits snugly against the lower side of the knife, advances and scrapes the dough from adhering to the knife. At the same time the press descends, the jaws open, and the bits of dough, now fashioned into the form of crackers, are carried away by the resumed motion of the endless apron. The dough, being elastic, slowly swells up after it has been pressed, and requires to be several times re-pressed before it is placed in the oven; for this purpose it is carried under the three rollers, *g g g*, by the onward motion of the belt. Extending across the apron in front of the first of these rollers is a straight bar or plate, which rests an instant as the rows of unbaked crackers are brought against it to push them into a straight line, and then rises to let them pass under the roller. Another similar guide again straightens the rows of crackers after they have passed the last of the rollers, *g g g*. After passing under the rollers, the crackers are stamped in the usual manner by a press which forces them up against the dies, and which is operated by the jointed lever, *u*. Arriving at the end roll of the endless apron, the crackers are received upon the inclined plane, *v*, and a scraper draws them down in even and compact rows into the baking pans which are placed upon the endless apron, A.



FOX'S "EXCELSIOR" CRACKER MACHINE.

The various operations of this massive machine are said to be admirably performed, and we hear from many sources that Mr. Fox's bakery is a model of order, neatness and perfection in its operation.

Patents for this invention have been taken out in England, France, and Belgium, as well as in this country; and for information in relation to the purchase of of rights or machines, inquiries may be addressed to the agent, Ira Jagger, at Albany, N. Y.

The reader is also referred to our advertising columns for further information.

About 2½ cubic feet of coal gas are consumed per hour in a common burner.

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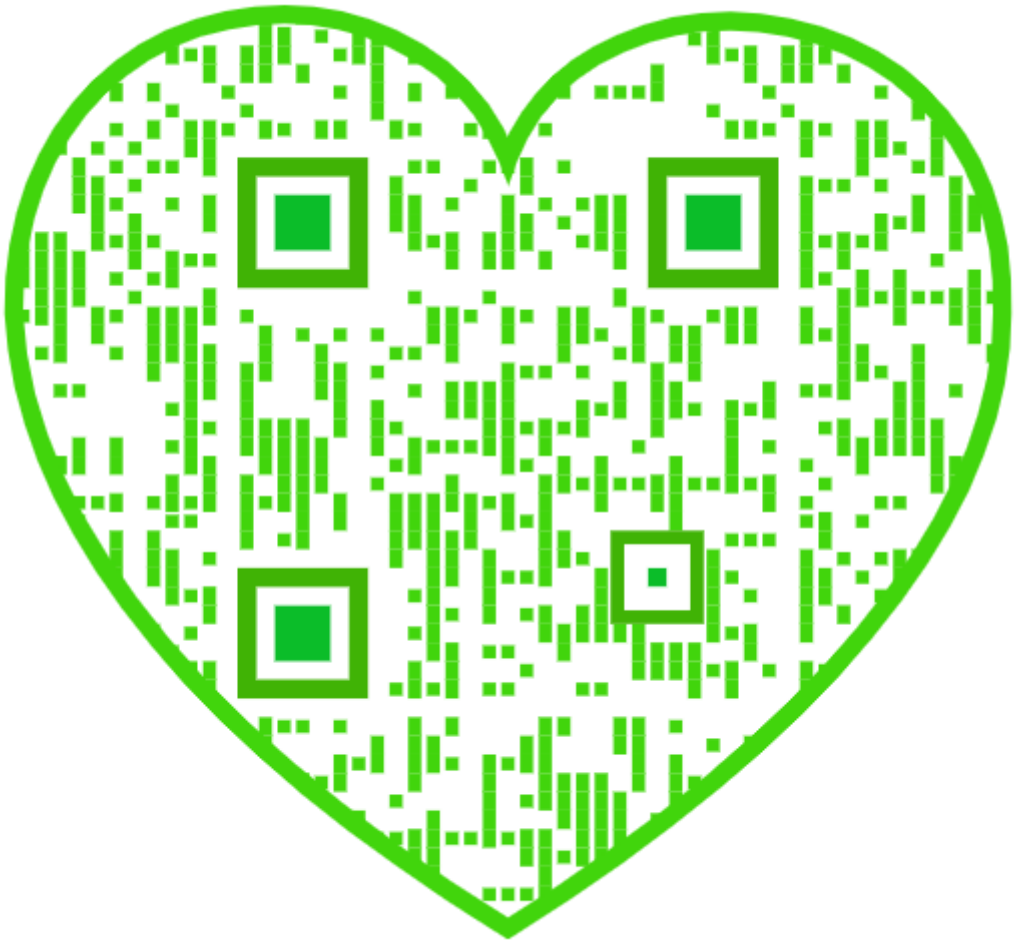

INTERESTING CORRESPONDENCE.

RAIN WATER SALT-WORKS IN YUCATAN.

MESSRS. EDITORS:—As the SCIENTIFIC AMERICAN is the *nucleus* of all that is valuable in regard to natural phenomena, I submit the following curious facts, hoping that they may be interesting to many of your readers.

When we compare the productions of men with those of nature, we must acknowledge that, though our efforts be great and the results admirable, natural productions are wonderful and grand beyond the power of man's imitation. This is particularly the case in the tropics, where the display of nature's wonderful productive power dazzles and bewilders the natives of a less congenial climate. Those who have not seen the banana tree, the mamey, the zapote, the papaya, the camote and innumerable other tropical fruits and productions, cannot believe such fabulous power of vegetation as really exists. Can you imagine a volcanic limestone formation, with here and there hardly more than a handful of earth in its cavities, producing giants in the vegetable kingdom, where, in our latitude, not a handful of grass would grow? With such a soil, men almost feel justified in saying that they do not need to work, nature being so rich that they have enough to supply all their necessities.

Along the northwest coast of Yucatan, from Campeachy to Sisal (a distance of about 120 miles), and on the northern coast, from Sisal to Telchac, and from the mouth of the river Lagartos to Chiquila, and, I think, from Telchac to Tilam (a distance of about 180 miles), there exists a piece of soil varying in breadth from half a mile to 3 miles, separated from the waters of the Gulf of Mexico only by a narrow strip of sand, this latter forming a bulwark against the sea-water and a protection to this soil, which is composed of a kind of clay from which the Indians manufacture their drinking cups or vessels in general use. (I send you a specimen of this soil, in case any of your readers or yourselves should be willing to make the analysis before I can have it made.) Into this soil tanks or reservoirs are dug to the depth of from 24 to 36 inches, with an area to suit the proprietor. There are a good many of these tanks which are nothing but natural cavities, from 2 to 5 feet deep, saving even the labor of digging a tank, the inexhaustible and lasting source of wealth and income. The only care that has to be taken is to situate a tank in such a manner that at no time the salt water of the gulf ever has access to it; this seems to be a paradox, if not an absurdity, but the fact is that if such is the case, there is no production of salt for one and even several seasons. Another fact is that in digging these tanks it is not unusual to find small springs of perfectly sweet water. These salines are not (as in Europe) leveled and prepared with art, divided into many receptacles for purifying seawater, and effecting its concentration; *here* nature does all the work, and its operation for the production of salt by the agency of sweet water, is as follows:—

The tanks being clean, they are filled with rain water during the rainy season, which begins in May and lasts till September, but generally with intervals sufficient to gather two harvests from May till October. In November and December enough rain generally falls again to produce a third one in March or April. As soon as the rain ceases, a kind of fermentation takes place, raising the temperature of the water gradually to 100, 110 and 120 degrees Fah., a temperature much above that of the atmosphere, after which the water begins to clarify itself by precipitating to the bottom a kind of brownish, gelatinous matter about $\frac{1}{8}$ of an inch thick. Up to that time the water has sustained its perfect sweetness, though there has been some concentration by evaporation; but from the time of the clarification it begins to acquire a salty taste, almost imperceptible in the beginning, augmenting quite rapidly until, by the constant influence of the sun, evaporation being sufficiently advanced, crystallization sets in, and crystals shoot out everywhere on the surface of the water, agglomerating and augmenting until the whole surface of the tank is covered with a crust of salt from 4 to 5 inches in thickness, which, by its own weight, precipitates to the bottom of the tank, where it is broken with a kind of pick-ax and taken out by hand by the native Indians; they wash it in the remaining water, load it upon carts and bring it to the depot, where they put it into bundles surrounded by huano leaves, in which it is sent to the interior of Mexico. (For curiosity's sake, I brought one of the bundles, which I submit herewith to your inspection.) This salt is of a light gray color and very pure. Some of the salines produce white salt, which has less value because they say that it salts less; the chief reason is its bitter taste, which seems to indicate the presence of sulphate of magnesia. Some of the proprietors told me that it was a kind of froth forming on the surface of the water, which is carefully collected and laid aside for crystallization. There is also the rose-colored salt, containing, probably, some of the mineral oxyds, may be oxyd of iron. An analysis of these products will alone clear this question.

When the harvest is made, the tanks are cleared, which is very little work, and nature's bounty fills them again with its spontaneous production, so that man has nothing to do but to reap always and forever, the supply being inexhaustible. LOUIS KOCH.

New York, May 31, 1860.

[We are obliged to our correspondent for the above interesting description of the remarkable salines of Yucatan. The continuation of his letter, which we omit, cites an article on this subject in the *Mejoras Materiales*, written by M. Villeveque—formerly French consul in Campeachy—which contains some profound reflections in regard to the source from which the salt is derived. The specimens brought by Mr. Koch of the formation in which the vats are dug are evidently full of salt, and the suggestion is so obvious that this salt is simply dissolved by the rains and washed into the pits, that we respectfully suggest to Mr. Koch to make a thorough examination of the facts in their bearing upon this hypothesis, on his return (in June) to that country of tropical marvels. If any of our scientific friends would like to examine specimens of this salt and the formations in which it occurs, they will find them at our office.—EDS.

VENTILATION OF MINES—THE STEAM JET.

MESSRS. EDITORS:—Being a constant reader of that valuable paper, the SCIENTIFIC AMERICAN, and having noticed frequent allusions to the ventilation of mines, I have thought it would interest some of your readers to peruse a description of a system of ventilation lately introduced by Mr. Wm. Milnes, Jr., of this place. Mr. Milnes owns and works a very extensive colliery at St. Clair, in Schuylkill county; and in order to ventilate his works, he has driven an air-way of 30 feet area to the surface, where there is an arched flue, 30 feet in length, containing a grate or furnace on which a very strong fire is constantly kept up. At the end of the flue is a chimney, 6 feet internal diameter and 60 feet high. The air-way is connected with the different parts of the works by means of *brattices* and doors, so that all the workings receive their proportionate supply of pure air. This plan of furnace and chimney worked very well until lately, when, the works becoming more extensive, it was found necessary to increase the ventilation. The furnace was driven to its fullest extent, sometimes using resin and oil to increase the draft, but it failed to draw off the explosive gases. After fully investigating the matter, Mr. Milnes concluded to introduce what is known in England as the "steam-jet system," and with the co-operation of Messrs. Pomeroy & Son, machinists, he has done so with the most gratifying results.

At the foot of the chimney he erected two boilers, 30 inches diameter and 20 feet long, from which a steam pipe is carried into the chimney, and so arranged as to distribute 25 jet pipes equally throughout the area of the chimney; these pipes point directly up and have an opening of $\frac{1}{8}$ of an inch, through which the steam passes at a pressure of about 75 pounds to the square inch. This plan works admirably, and it was found, by actual measurement, to have *nearly doubled* the amount of air passing through the air-way. So well pleased was Mr. Milnes with the result, that he has since put up two more boilers and increased the number of jets to 45, with proportionate effects.

In an answer to a recent correspondent, you truly remark that, where ventilation depends exclusively on a fire, *it cannot be regular*. There are other causes besides those mentioned by you, that operate against the furnace system. It is well known that no chimney will draw as well when the atmosphere is dull and heavy as it will in clear weather. This is one of the principal causes of explosions in mines, as they almost invariably take place during the former state of the atmosphere; for instead of having an increased ventilation at such times (which they should have, as the air is not so pure), it is diminished in consequence of the chimney not drawing. The explosive gases accumulate in such weather, and the workmen are either compelled to leave the mine or run the risk of an explosion. With the steam-jet system, as it is adopted by Mr. Milnes, this is all avoided, as the ventilation is under the perfect control of the proper persons. Should it become necessary to increase the draft, all that is to be done is to increase the pressure of the steam, and it is accomplished. Mr. Milnes assured me, a few days ago, that it would have been impossible to have carried on his works during the greater part of this Spring, had it not been for the steam jet, as the weather has been very bad for ventilation. R. ALLISON.

Pottsville, Pa., May 30, 1860.

HINTS TO IMPROVERS OF COTTON GINS.

MESSRS. EDITORS:—Having read several articles in the present volume of your valuable paper (pages 212, 246, 278 and 292) in relation to the process of ginning cotton and the construction of cotton gins, I will take the liberty of throwing out a few hints for the benefit of those now engaged in making experiments with a view to supersede the old saw or Whitney gin. I am well aware there are many good roller gins now made for the purpose of ginning Sea Island cotton, but as that kind of cotton commands from 30 to 50 cents per pound, the planter can afford to operate a machine that is or may be capable of turning out only 150 to 200 pounds of lint per day; but he could not use that kind of a gin for his Upland cotton, which (as a general rule) will not bring more than 10 cents per pound in the market; hence the almost universal use of the saw gin. A good 60-saw gin, driven by four mules, will turn out from three to four bales of Upland cotton per day—averaging 500 pounds each. In producing a gin for general use, to supersede the Whitney, the questions to be taken into consideration by the inventor are: "Can I get up a machine that will turn out as much lint per day as the saw gin? if not, will the superior quality of the lint or staple induce the planter to throw aside the gins now in use? and further, can they be adapted to the gearing, power, building, &c., now in use? and last (but not least), can or will the negro understand and operate the machine as readily as the saw gin?" Now, if any of the numerous readers of the SCIENTIFIC AMERICAN can make or have already produced a machine that can gin from three to six thousand pounds of seed cotton per day, and the lint be worth one cent per pound more than that ginned by a saw gin, and the machine requires no greater number of hands to operate it, no more power to drive it, and costing no more than the Whitney—then I will say (with your correspondent, "A. J. H.,") that the fortunate inventor will soon own plantations and gin his own cotton as it ought to be done. H.

Camden, N. J., May 28, 1860.

AGRICULTURAL CAPACITIES AND CLIMATE OF WESTERN TEXAS.

MESSRS. EDITORS:—On page 243 of the present volume of the SCIENTIFIC AMERICAN, under the head o. "Steam Plowing in Texas," Mr D. M. Richings, after speaking very highly of the whole State for general agricultural purposes, says, of western Texas, that, "owing to the drouths that annually visit that portion of the State, it cannot be said to be at all calculated for planting or farming." Mr. Richings has probably been led into this error, not by his own observation, but by the representations of people residing in other parts of the State, where there is a prevailing prejudice, as is common in all new and rich countries, in favor of their own locality above all others. The fact that there is not so much planting and farming done in western Texas as in other parts of the State, is calculated to foster these impressions. But there are two more obvious reasons for it. One is because the country is not as fully settled—the other, that the present inhabitants are satisfied with more profit from the spontaneous productions of the earth, without labor, than they can make anywhere else with all the labor at their command.

The agricultural readers of the SCIENTIFIC AMERICAN, I presume, would like to know why planting and farming cannot be done to advantage where the most luxuriant grasses grow spontaneously, of the richest species, at all seasons of the year, of some variety or other. There is scarcely any vegetable growth of the farm that requires more rain or moisture than a heavy crop of grass, such as grows in western Texas every year. This fact is known

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to every practical farmer everywhere. All prairie countries are more or less subject to drouths at some season of the year; but in a climate where there is so little frost as in western Texas, there is plenty of time and plenty of rain to raise one crop, at least, during any year.

The time is fast approaching when western Texas will, in spite of the Mexicans and Indians, be as numerously inhabited, and her soil as successfully cultivated, as any other part of the State. The present inhabitants are well calculated to bring about these results. They know the value of the country, and if Congress will not protect them they will protect themselves. They are encouraging a healthy emigration, which is daily increasing from all parts of the older States, as well as from foreign countries. They are calling loudly for internal improvements; many of these have been authorized, well calculated to develop the vast resources of the country. Some have been commenced, and others are approaching completion, the effects of which are beginning to foretell the future of this nature-favored region. When peace shall have been restored and secured on our frontier and swords beaten into plowshares—when the steam plow shall be the champion and the reign of Ceres shall succeed that of Mars—then shall we see that planting and farming can be done to advantage in western Texas. It is now already known to some that the finest Sea Island cotton can be produced anywhere on the coast within reach of the sea breeze, at the rate of a bale to the acre, a sample of which I send you enclosed.

D. S. HOWARD.

Corpus Christi, Texas, April 26, 1860.

A STEAM AND AIR ENGINE—ELECTRICAL PHENOMENON.

MESSRS. EDITORS:—While I was in Mulhouse (France), in 1853, a local company owned a steam engine of 12 horse-power, which was furnished with a boiler having only 8 horse-power of heating surface. As it became an urgent matter to increase the power, which was shown by the dynamometer to be 660 kilogrammes (1450 lbs.) lifted one meter (40 inches) in a second, an air-pump was added to the engine, the capacity of which pump was double the diameter and stroke of the feed-water pump with which it acted in concert. This arrangement brought the effective horse-power of the engine up to 750 kilogrammes lifted one meter in a second. The engine was kept running one-fifth faster, and the same pressure was maintained in the boiler; but it required more fuel, although not an increased proportion, to the gain of power. The necessary quantity of feed water was reduced by about one-eighth.

I was reminded of this case by having seen it recently stated in the SCIENTIFIC AMERICAN that only about one-fifth of the heat of coal is absorbed in boilers. In the case alluded-to, the air was fed in through a pipe commenced near the top of the chimney, thence descending through it, growing gradually warmer, and finally entering as feed into the boiler at its bottom Perhaps such an arrangement may be found profitable in other cases, even when the boilers are not small. It was claimed for this plan that, besides the additional volume of elastic gas in the boiler, the steam was not so easily condensed in the pipes and cylinders as formerly; it being held in suspension by the heated air. This arrangement will not answer for condensing engines, as the vacuum air-pump would have too much work to perform, and the condensation of the steam would be much slower.

I have recently observed that if two pieces of raw india-rubber are held in close contact for some time, a brilliant line of light is seen at the joint when they are drawn asunder in the dark. If this is caused by electricity, it is not due to any of the three sources of electricity usually recognized, namely, friction, evaporation and chemical action. E. ROSE.

P. S.—Answering to the call for scientific help for the Polytechnic Association of the American Institute, in your city, I should be happy to furnish it if any member will be willing to act as my oral representative.

Ottawa, Ill., May 31, 1860. E. R.

[The engine described by our correspondent was converted into a combination steam and hot-air motor, and considerable saving was effected in utilizing the waste heat that had before escaped up the chimney, by applying it to warm the air that was fed into the boiler. The electric spark produced by the pieces of india-rubber (see last paragraph before the postscript) is undoubtedly due to frictional electricity.—EDS.

PULLING PINE STUMPS.

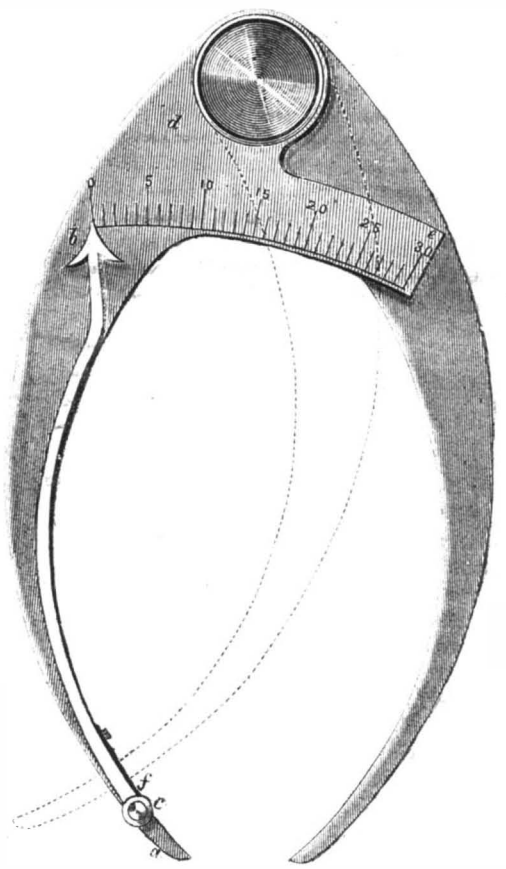
MESSRS. EDITORS:—Our pine stumps in this section of the country are very troublesome and formidable. It is greatly to the interest of planters to have them removed. The process of digging and cutting or burning is too slow; we have a great many of them and require some machinery to work them with. Do you know of anything invented that will answer the purpose? The largest stumps are from 2 to 3 feet in diameter—most of them perfectly solid—with long, lateral roots, besides a long tap root firmly imbedded in a clay soil. The lateral roots, like the stumps, are of solid, light wood—large and long. Can you recommend any machine that will remove them from the soil? C. W. DUDLEY.

Bennettsville, S. C., May 28, 1860.

[There are a number of existing patents for stump extractors, many of which have been illustrated in the columns of the SCIENTIFIC AMERICAN, and it seems to us that the wants of our correspondent are met in some of them. We hope the matter may receive attention from those who can afford the desirable relief.—EDS.

A CUBAN INVENTION—IMPROVED CALIPERS.

MESSRS. EDITORS:—Should you attach any importance to the invention of that instrument whose description and sketch I include in this letter, and think it worthy of occupying a place in the columns of that most excellent paper, the SCIENTIFIC AMERICAN (which comes to throw light even in the most remote corner of this island), you may publish it in order that if any of your readers find it useful they may adopt it.



The object of the invention is the construction of an instrument that will measure objects with greater precision than can be done with the common calipers. For this purpose the index, *a b*, girating at *c*, at the end of the leg, *c d*, of the calipers, has its arms, *a c c b*, in the proportion of one to ten. The arc, *b c*, which forms a part of the leg, *c d*, is divided arbitrarily into any number of equal parts, numbered as in the drawing.

To find out if two bodies are of equal dimensions, it will be sufficient to observe, when measuring them, whether the end of the index points to the same division on the scale; if such be the case, it is certain that both bodies are alike. As the smallest difference in the size will be augmented *ten times*, it will be made more sensible to the eye, and the measurement will be nearer to the exactness desired.

The spring, *f*, serves to keep the short arm of the index in contact with the body measured. The leg, *g*, put in the position marked by the dotted lines in the drawing, will make the instrument available for measuring inside diameters. JULIUS DEPREZ.

Colon, Cuba (W. I.), April 25, 1860.

PHILOSOPHY IN AN EGGSHELL.

MESSRS. EDITORS:—It appears to me that the difficulty suggested by your very *wise* correspondent from Lancaster, Pa., relative to the heat of the butt end of an egg, is capable of a very simple solution. The difference of thermal sensation between the large and small ends of an egg, when applied to the tongue, is due to the fact that the large end of every egg possesses a small air-chamber, designed for the supply of the chicken, or at least supposed to be. Now, this portion of air is a good non-conductor. When, therefore, the tongue is applied to the shell, it is almost instantly heated, and such heat not being readily conveyed away by the air, the sensation of heat is felt. When the tongue is placed at the other end, the fluids within, being good conductors and in direct contact with the shell, convey away the heat rapidly from the shell and tongue, and then the sensation of cold is experienced. That this is the correct explanation is, I think, evident from the fact it is not at the *very first* touch of the tongue to the egg that the difference is experienced. A perceptible moment of time elapses ere the sensation of warmth is detected, and so, too, that warmth extends only over a small spot, answering exactly to the air-chamber, and not permeating the whole bulk of the egg, as would be the case with any "vital spark." Those persons who try the experiment will notice this. I, for one, do not consider it "a wonderful fact."

So also with the sugar question. The light proceeding from the friction or fracture of sugar is wholly electric, and the apparent sparks are only electric scintillations. I was surprised when, a week or two ago, I saw the question asked; for I thought all were familiar with the fact. If the readers of the SCIENTIFIC AMERICAN will attempt to produce these "sparks" on the night of some damp, warm, summer day, they will find it next to impossible to do so, thus showing that the electricity has been dissipated by the moisture in the atmosphere. I well remember (when a boy) once amusing myself on a dark winter evening, by striking out these sparks of electricity. I was then longing for an electrical machine, but the purchase of it being beyond my means, I resorted to some large lumps of loaf sugar (as I had read that it was highly electric when rubbed or abraded), and I was much delighted with the resultant light and glow. Are not these explanations correct ones? R. W.

New Berlin, N. Y., May 26, 1860.

GRIST MILLS AND MILLING.

MESSRS. EDITORS:—On page 307 of the present volume of the SCIENTIFIC AMERICAN you published the letter of a correspondent in Baltimore, giving some practical information on the subject of milling. Having built about 40 flouring mills during the last 14 years. I believe that a few suggestions from me on the subject will be useful to many persons.

My present mode of constructing mills is to give stones 4 feet 8 inches in diameter, 160 revolutions per minute, and a 4-feet pair 170 and sometimes 190 revolutions per minute. In the early part of my career as a millwright, we used to run stones with a much slower motion than we do at present. My experience has led me to prefer the faster motion, because the grain is thereby passed more rapidly from the eye of the stone to the grinding or flouring surfaces, and the grain is thus ground more rapidly, and also more evenly. I have found that with large stones and a slow motion, it was very difficult to keep a sufficient amount of grain under the grinding surfaces. With 4-feet stones running at the rate of 190 revolutions per minute, I find that 1,200 pounds of wheat can be ground per hour; all things being in good order, and ample power furnished for the purpose. I now use 4-feet stones in most of the mills which I am building, and prefer those to any other size, as I believe they do as good work and grind as fast with the same power as larger stones.

My mode of manufacturing corn meal is to use a reel about 5 feet long, covered with No. 19 wire cloth, which makes finer meal than the coarser cloth that has been more commonly used for bolting. We make Graham flour by the same bolt, which takes off the coarse bran. I use 60 feet of bolting surface for wheat flour, so as to get out the whole flour in the wheat and separate it from the bran.

I. B.

Binghamton, N. Y., May 31, 1860.

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NEW YORK TELEGRAPHIC OPERATIONS.

The heart of the American electric system is situated at No. 21 Wall-street, this city In this building, the once-divided telegraph companies are now united in a grand combination of operations, and great economy we understand has been secured by this arrangement. The basement is occupied by the Delivery Department, in which a large number of messenger-boys are employed for delivering dispatches in those parts of the city below Canal street, while those for places above this street are telegraphed to the nearest station on the "City Line," and delivered thence.

The Receiving Office is on the first floor, where all messages are taken in and forwarded to the appropriate room for transmission by a "dumb waiter," which, together with a speaking-tube, communicates with all the operating rooms above.

On the second floor is the office of the "City Line," which has two wires terminating respectively at Madison-square Post-office and at Fort Hamilton, L. I. This line uses the "Combination" printing instrument (illustrated in our last issue), and has 11 different stations within the city, at the principal hotels and other places. It has also offices at Brooklyn, Williamsburg, and Forts Lafayette and Hamilton. The communication across the East river is effected by a cable at "Hell Gate." This room also contains the office of the "Sandy Hook Line," which is worked by Morse's instrument and is used to report the movements of vessels.

The third floor is occupied by the Southern lines, which formerly entered the "Magnetic" office at No. 43 Wall-street, but since their recent consolidation with the "American" company, have been removed here. They work one wire to Washington, which has often been operated in single circuit to Augusta, Ga., 900 miles; and even to New Orleans. For way-business they have one wire to Baltimore and three to Philadelphia. The "National Line" has an instrument in this room, connecting direct with Pittsburgh, Pa., and which has often been worked in direct connection with Louisville, Ky., in the same way. All these wires use the Morse instrument.

The fourth floor is occupied by the "New York, Albany, and Buffalo" company, with two wires in single circuit with Buffalo, *via* Troy and Albany, 530 miles, and three others terminating respectively at Albany, Troy and Greenbush, N. Y. The latter is used mostly for the Hudson River Railroad business. There are also two other wires owned by the Erie Railroad Co., extending *via* Piermont to Port Jervis, and *via* Jersey City to Dunkirk, 465 miles in one circuit. All messages are received by *sound* alone, on the Morse instrument, in this room.

On the fifth floor are the remaining lines of the "American" company. Here are eight wires connecting direct with Boston, 250 miles, five of which use the Morse instrument, and "receive by sound." These are the lines owned by the "Union" company, before its recent consolidation with the "American," whose office was at 23 Wall-street. The other three wires use the "Combination" instrument, but have, until very recently, used the "House," by which it was necessary to re-write all business at Springfield. There are also two House instruments in connection with Baltimore and Washington, and a Morse line communicating directly with Montreal, *via* Troy, a distance of about 500 miles.

The sixth floor contains two or three hundred cups of Grove's and Avery's batteries, which supply all the lines with the necessary amount of electric fluid. In this Battery Room, 45 cups of Grove's or Avery's battery are employed on one line. The latter has two strips of platinum in each cup; and an amalgam of mercury, lead and tallow is employed for the zinc cylinders. Telegraph messages are sent with any machine by a single wire; the ground forms the return conductor, and for this purpose, the battery is connected at one end to a thick copper rod which is attached to a plate of copper, 2 feet square and half an inch thick, buried in the moist earth underneath the basement floor. The positive plate of the battery is connected with the wire which forms the air-line. The electric circuit, and its phenomena still baffle the most ingenious casuists to explain satisfactorily. No person knows why an electric current prefers one substance to another in traveling, or why it always moves in a circuit.

One large battery of cups works an entire long line and all the way-lines; either 12, 14, 20, 30, 40 or 45 are employed according to the distance. Copper wire, although a most excellent conductor, expands and contracts so much with atmospheric changes of temperature that it is very subject to breakage, and is not therefore used on our lines. "No. 8" galvanized iron wire is the kind that is now employed, and is found to answer admirably, especially on the inland lines. Near the sea-shore, it is liable to be affected with saline matter, by which the chloride of zinc is formed and the zinc coating very soon corrodes. In passing through such cities as Pittsburgh, where there is much sulphur in the coal smoke, the galvanized wires are attacked by the sulphuric acid, and the sulphate of zinc is formed, and thus the coating is also soon removed. We believe that Bain was the first person who employed galvanized zinc-coated iron wire in telegraphing, and we are surprised that one of his simple chemical telegraph instruments is not used at all the stations, because it will work with a lower battery, and in cases when none of the mechanical instruments can operate, for want of a sufficient current, such as when part of the line has been torn down by a storm. There are 1,300 telegraph stations in the United States, in which 3,500 persons are employed.

The whole number of instruments at present in daily use in this building is twenty-eight, twenty-one of which are Morse, five Combination, and two House. The Board of Brokers also have a Combination instrument in the Exchange, connecting with Philadelphia by a separate wire belonging to the "American" company.

By far the largest number of lines in the country are worked under Morse's patent; the printing telegraphs not being employed nearly as much as is supposed; they never have been used to any extent, except on the lines between this city, Boston and Washington. The extreme cheapness and simplicity of the Morse instrument have always prevented its being superseded by the more costly printing instruments. The "Combination" printing instrument is the best adapted for through lines doing a large amount of business.

Adjacent to the office is a supply store, where every article necessary for the building, repairing and operating the various lines is kept on hand, subject to the order of the superintendent.

The Southern lines formerly crossed the Hudson by two high masts at Forts Washington and Lee, but after their destruction by a high wind sometime since, they have crossed by cables from the foot of Thirteenth-street to Hoboken, N. J.

By the consolidation of all these lines into one great central office, a great saving of expense and increase of business facilities are obtained; and the officers of the consolidated company seem determined to increase, by every means in their power, the efficiency of this most invaluable means of communication.

There are in England, four principal lines of electric or magnetic telegraphs. The longest of these lines extends over a distance of 6,193 miles, the next longest 3,656 miles, the third 308 miles, and the fourth of 119 miles, making an aggregate of 10,276 miles. The length of the wires used on these lines amounted, in the year 1858, to 48,990 miles; the number of stations opened for the public was 953, and the number of instruments was 4,085.

It would seem as if efforts were about to be made to lay a new Atlantic telegraph line; as, by the late news from Europe, Mr. Milner Gibson had introduced Mr. T. P. Shaffner to Lord Palmerston, and he explained to the premier his plans for laying short Atlantic cables from Scotland to the Faroe Isles, Iceland, Greenland, and thence to the continent of America.

TRADE TRICKS UPON TEXANS.—A correspondent (M. B. R.), writing to us from Price's Creek, Texas, states that all the people in that region are exasperated by the frauds perpetrated upon them in the coarse shoes sent from the North. The welted shoes have their outer soles formed of split leather, and the space between the outer and inner soles is filled with paper and shavings, cemented by paste. The single-soled shoes, for which they have paid $1.60 per pair, have thin outer soles sometimes pasted upon thick paper. The Texans are making efforts to manufacture their own shoes. Our correspondent considers it a very suicidal policy for manufacturers to make such trash, and merchants to sell it. So think we!

OUR MODERN HOUSEHOLD CONVENIENCES—MINERAL POISONS.

MESSRS. EDITORS:—I will not encroach upon your pages by a lengthy article upon the above subject, but I would respectfully inquire of those who make chemistry a speciality, of the medical profession, and of the public at large, if, in the middle of the nineteenth century—this boasted age of scientific advancement and artistic skill, it is not disgracefully humilitating that so many in the community must be prematurely consigned to the grave by daily swallowing poison introduced into their food by the unsafe arrangement and ignorant and careless management of what are termed "modern conveniences?"

Having recently been called to attend several cases of severe colic, induced by eating cranberries and apples stewed in copper and bell-metal vessels, and more recently having discovered that the members of a family in one of the finest residences in Boston had been slowly and seriously poisoned by the cook (who was ignorant of the danger) having, for a long period, been using the water from a copper boiler connected by a lead pipe to a lead reservoir, in preparing the tea and coffee and boiling the vegetables, and knowing this to be a common occurrence, I cannot but envy our ancestors who, although they were sometimes made sick by the use of the bell-metal, drank pure water from the "Old Oaken Bucket," and were blessedly ignorant of "modern conveniences" by which we are so luxuriously poisoned, and finally die, under the scientific cognomens of "gastris," "entiritis," "carcinus" and "paralysis."

But, surely, some method can be devised by which we can enjoy the benefits of modern improvements, without such risk to health and life. Let water be introduced into kitchens only through *iron, glass, wood or gutta-percha.* So arrange the hot-water apparatus (if composed of copper or lead) that it can only be drawn in the chambers where it is required for bathing, &c., and once a week, or more frequently if necessary, let on the water in the wash-room by a lock faucet, the key of which can be kept in a secure place. Banish for ever, from the kitchen, lead pipe, copper vessels and copper covers (if the copper is tinned, the tin will soon wear off), and families may feel comparatively safe from domestic poisoning.

One suggestion more, and I have done. Should an individual prefer to take lead and copper with his sustenance, perhaps it might be considered rather oppressive to deny him the privilege. Yet it would seem but just that those who do not admire these paralyzing condiments should be protected by the legal appointment of judicious inspectors, whose duty it should be to examine the culinary apparatus in all our public institutions, hotels, confectioneries and restaurants. A sanitary provision of this nature, if rigidly enforced, would (I sincerely believe) materially diminish the records of mortality. CHAS. M. WINDSHIP, M.D.

[We copy the above important article from the Boston *Medical and Surgical Journal.* The water used in the family referred-to was analyzed by Dr. A. A. Hayes, Massachusetts State Assayer, exhibiting a fearful result. Dr. Windship justly recommends, as a substitute for lead, the use of pipe made of glass, iron, wood or gutta-percha. The latter article is now attracting considerable attention, as we learn from an extensive manufacturer, Mr. Samuel C. Bishop, of No. 181 Broadway, this city. —EDS.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

Machinery for Dressing Screw Heads.—H. A. Harvey, administrator of T. W. Harvey, late of New York, deceased, has applied for the extension of a patent granted to said T. W. Harvey on the 18th of August, 1846, and re-issued on the 4th of January, 1859, for an improvement in the above-named class of inventions. The testimony will close on the 17th of July next, and the petition will be heard at the Patent Office on the 30th of that month.

Truss Bridge.—Joseph Stone, administrator of W. Howe, late of Springfield, Mass., has applied for the extension of a patent granted to said Howe on the 28th of August, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 31st of July next; and the petition will be heard at the Patent Office on the 13th of August.

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BLAKE'S IMPROVED BELT-FASTENER.

The field for invention is being constantly enlarged, not only by the increased demand for machinery resulting from the growth of the country in population and wealth, but also from the fact that all this increase in machinery makes improvements in articles of general use in machines of greater value. This is strikingly shown in a simple little incident of mechanical operations—the fastening together of the ends of belts. Notwithstanding all the inventions which have been made in this department, a belt-fastener that should be decidedly superior to all others would yield, even now, as great a fortune as any one need to wish; and the very one illnstrated in the annexed cut is, for ought we know to the contrary, one of this character.

Fig. 1

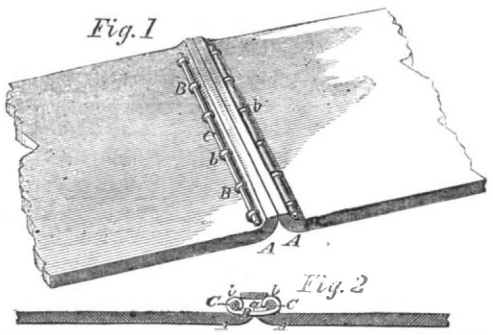


Fig. 2

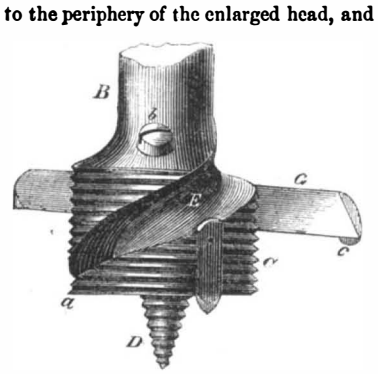
This invention is so simple and so clearly shown in the engraving as hardly to require any description. A series of slits are made through the two pieces, A A, of the belt to be joined near their ends, and rods, B B, of small wire, with loops, *b b*, at their ends, are passed through these slits. The wire rods, C C, being run through these loops, complete the joint. The following advantages for these fasteners are claimed by the inventor, G. W. Blake:—"1. They can and will be afforded to those wishing to use them at less cost than the lacing, and can be applied to the splicing of belts in much less time than by lacing. 2. As they do not come in contact with the pulley, they will last to an indefinite time, and do not make a noise in passing over the iron pulley. 3. They are not liable to injure the hands of the workman in shipping them upon the cone pulleys used in machinery. 4. One inch in width of belt, with three links and one rod of No. 15 wire gage, will sustain more than 400 lbs., while 30 to 40 lbs. per inch are as much as is usually subjected; this fact shows that the joints are strong."

The patent for the invention was procured, through the Scientific American Patent Agency, April 24, 1860, and any further information in relation to it may be obtained by addressing L. W. Blake & Sons, at East Pepperell, Mass.

BLAKE'S PATENT AUGER.

The annexed cut represents an improved auger invented by James Blake, particularly adapted to boring large sixed holes.

Upon the spindle, B, of the auger is made the enlarged head, C, terminating in the screw-point, D. Through this enlarged head is made the spiral groove, E, ending in the radial cutting edge, *a*. A sharp cutter, *f*, is secured to the periphery of the enlarged head, and screw-



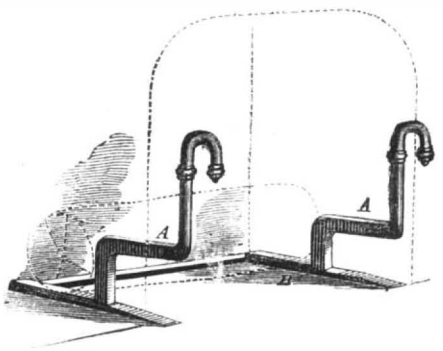
threads are cut in its surface. In a triangular slot in the head, C, is secured, by a set screw, the knife, G, which has a horizontal edge, and carries at its end the enlargement, *c*, which is ground to a vertical edge.

As the auger enters the wood, it cuts first a hole of the size of the enlarged head, C, passing the chips up through the spiral groove, E. When the knife, G, reaches the wood it cuts a hole, the radius of which is equal to the distance of the lip, *c*, from the center of the auger. As this difference may be varied by sliding the knife, G, in its slot, the size of the hole may be regulated at pleasure. The thread on the head, C, draws the auger inward and feeds it to its work, and this head holds the auger securely in the center of the hole—both important features in this invention. Several knives, G, of different lengths may be provided for each auger, and thus it may be adapted to cutting holes of any size through a wide range.

The patent for this invention was granted, through the Scientific American Patent Agency, April 17, 1860, and any further information in relation to it may be obtained by addressing L. W. Blake & Sons, at East Pepperell, Mass.

IMPROVED ANDIRON.

The blessings of advancing civilization are almost all purchased at the expense of considerable sacrifices; the great law of compensation everywhere manifesting its presence. The neat, combined and brilliant gaslight has been declared, by an eminent oculist, as the most powerful cause of diseases of the eye; the abundant supply of that most necessary element, water, in its course through the lead pipes which conduct it to our dwellings, washes off particles of metal which, slowly accumulating in the system, produce a frightful train of maladies—colic, paralysis, neuralgia—which are embraced in the general term of "lead poison." So numerous are the evils and annoyances resulting from the "conveniences" of modern luxury, that there was a universal assent to the position assumed by a popular preacher who described a first-class house as eminently "a means of grace." Of all modern inventions, the one which is attended with the greatest drawbacks is the *stove*. The man who can command the good, old-fashioned sparkling fire of oak or hickory wood, blazing in the open fire-place, filling the room



with its cheerful light, pervading with health every fiber of his frame and planting roses in the cheeks of his daughters, may well dispense with all the luxuries of civic life, and has no occasion to envy the citizen whose lungs are filled with the foul air of a stove or furnace, and whose sallow complexion and unhealthy appearance tells the sure story of inward disease of stomach or liver. We envy those sections of the country in which andirons are in such general use that improvements in them are deemed worth patenting.

In the plan illustrated in the annexed cut, the andirons, A A, are welded to the rectangular bar, B, which rests upon the hearth, making the whole in one piece. The ends of the bar, which project forward, are flattened, as shown, so as to be out of the way as much as possible. Any desired modifications of the form, either of the andirons or base, may be made to suit the taste or convenience of those who use them; the patent being for the general plan here shown.

The inventor says:—"The advantages of this improvement, over all others, I claim to be the following: 1. There is no front foot or feet to them, which adds to their appearance, as I conceive, and the front is more easily kept clean and polished. 2. There being no feet to obstruct, the heat from the fire is thrown out in every direction. 3. By this arrangement the irons are always in place, and are not falling over while the process of building a fire is going on, as the old-arranged irons are apt to do; for, of themselves, *these* stand very firm and steady, and then the "back-log" lying on the bottom plate holds them still more secure. 4. There is no obstruction to the free use of the broom, and the hearth around the fire can be kept very neat. 5. The ashes can be removed from the fire-place without removing the irons. 6. The cost is less, perhaps, than on any of the old plans, requiring less brass and less work to make the front, and no more to construct the other part."

The patent for this invention was procured (through the Scientific American Patent Agency), on March 27, 1860; and further information in relation to it may be obtained by addressing the inventor, John B. Logan, at Blountsville, Tenn.

AN INVENTOR'S EXPERIENCE IN PROCURING AN ENGLISH PATENT.

Dickens, in his own peculiar way, thus relates the "circumlocution" experience of an inventor in attempting to procure an English patent:—"When the Christmas holidays were over, I went up to London by the parliamentary train, and hired a lodging for one week from Thomas Joy. He informed me that the first step to be taken in patenting the invention was to prepare a petition unto Queen Victoria. A declaration before a Master in Chancery was to be added to it. These we likewise drew up. After a deal of trouble I found out a Master in Southampton Buildings, Chancery Lane, nigh Temple Bar, where I made the declaration, and paid eighteenpence. I was told to take the declaration and petition to the Home Office, in Whitehall, where I left it to be signed by the Home Secretary (after I had found the office out), and where I paid two pound two, and sixpence. In six days he signed it, and I was told to take it to the Attorney-General's chambers, and leave it there for a report. I did so, and paid four pound, four. Note:—Nobody (all through). over-thankful for their money, but all uncivil.

"My lodging at Thomas Joy's was now hired for another week, whereof five days were gone. The Attorney-General made what they called a 'Report-of-course' (my invention being unopposed) and I was sent back with it to the Home Office. They made a Copy of it, which was called 'a Warrant.' For this warrant, I paid seven pound, thirteen, and six. It was sent to the Queen, to sign. The Queen sent it back, signed. The Home Secretary signed it again. The gentleman throwed it at me when I called, and said, 'Now take it to the Patent Office in Lincoln's Inn.' I was then in my third week at Thomas Joy's, living very sparing, on account of fees. I found myself losing heart.

"At the Patent Office in Lincoln's Inn, they made 'a draft of the Queen's bill,' of my invention, and 'a docket of the bill.' I paid five pound, ten and six, for this. They 'engrossed two copies of the bill; one for the Signet Office and one for the Privy-Seal Office.' I paid one pound, seven and six, for this. Stamp duty, over and above, three pound. The Engrossing Clerk of the same office engrossed the Queen's bill for signature. I paid him one pound, one. Stamp duty again, one pound, ten. I was next to take the Queen's bill to the Attorney-General, and get it signed again. I took it and paid five pound more. I fetched it away, and took it to the Home Secretary again. He sent it to the Queen again. She signed it again. I paid seven pound, thirteen, six, and more, for this. I had been over a month at Thomas Joy's. I was quite wore out—patience and pocket.

"But I hadn't nigh done yet. The Queen's bill was to be took to the Signet Office in Somerset House, Strand—were the stamp shop is. The Clerk of the Signet, made 'a Signet bill for the Lord Keeper of the Privy Seal.' I paid him four pound, seven. The Clerk of the Lord Keeper of the Privy Seal made 'a Privy-Seal bill for the Lord Chancellor.' I paid him four pound, two. The Privy-Seal bill was handed over to the Clerk of the Patents, who engrossed the aforesaid. I paid him five pound, seventeen and eight; at the same time I paid Stamp duty for the Patent, in one lump, thirty pound. I next paid for 'boxes for the Patent,' nine and sixpence. Note:—Thomas Joy would have made the same, at a profit, for eighteenpence. I next paid 'fees to the Deputy, the Lord Chancellor's Purse-bearer,' two pound, two. I next paid 'fees to the Clerk of the Hanaper,' seven pound, thirteen. I next paid 'fees to the Deputy Clerk of the Hanaper,' ten shillings. I next paid to the Lord Chancellor again, one pound, eleven, and six. Last of all, I paid 'fees to the Deputy Sealer, and Deputy Chaff-wax,' ten shillings and sixpence. I had lodged at Thomas Joy's for over six weeks, and the unopposed Patent for my invention, for England, had cost me ninety-six pound, seven, and eight pence. In addition to this expense I say nothing about being tired of my life while I was patenting my invention."

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NEW PLAN FOR TIDE-MILL WATER-WORKS.

The following plan for arranging water-works for a tide-mill is communicated by Dr. J. Seguin to *Le Génie Industriel*. It is so simple, and, in certain situations where the tides rise to a great hight and where there are conveniences for forming the ponds, it would furnish so extensive and constant a motive power that we wonder it has not been employed before this time.

Two large basins are formed communicating with the sea, and the works are placed in a trench leading from one basin to the other. Dams are placed across the mouths of the basins leading to the sea, one of which dams is provided with a hanging gate or series of gates swinging inward, while the other has gates swinging outward. The former basin is filled by the high tide, and the latter is emptied whenever the tide is low; and thus the water is constantly maintained at a higher stage in the former than it is in the latter. By this arrangement, a constant waterfall is obtained in the canal connecting the two basins.

Of course, the fall would be considerably less than the rise and fall of the tides, and the plan would be practicable only where this amounted to several feet. In order to show, at a glance, on what parts of the coast this plan might be practicable, we give the rise and fall of the tide at several points on the Atlantic and Pacific coasts. The figures are extracted (by permission) from the tide tables compiled by Professor A. D. Bache, Superintendent of the United States Coast Survey, and published by E. & G. W. Blunt, No. 179 Water-street, this city.

Port.	Mean. Feet.	Spring Tides. Feet.	Neap. Tides. Feet.
Portland, Maine	8·8	10·0	7·6
Portsmouth, N. H.	8·6	9·8	7·2
Newburyport, Mass.	7·8	9·1	6·6
Salem, Mass.	9·2	10·6	7·6
Boston Light, Mass.	9·3	10·9	8·1
Boston, Mass.	10·6	11·3	8·5
Nantucket, Mass.	3·1	3·6	2·6
Montauk Point, L. I.	2·0	2·5	1·4
Sandy Hook, N. J.	4·8	5·6	4·0
New York City	4·3	5·4	3·4
Watch Hill, R. I.	2·7	3.1	2·4
New Haven, Conn.	4·8	6·6	5.1
Cold Spring Inlet, N. J.	4·4	5·4	3·6
Cape May Landing, N. J.	4·8	6·0	4·3
Delaware Breakwater, Del.	3·5	4·5	3·0
New Castle, Del.	6·5	6·9	6·6
Philadelphia, Pa.	6·0	6·8	5·1
Old Point Comfort, Va.	2·5	3·0	2·0
Baltimore, Md.	1·3	1·5	0·9
Charleston (Castle Pinckney), S. C.	5·3	6.3	4·6
Fort Pulaski (Sav. entr.), Ga.	7·0	8·0	5·0
Savannah (Dry Dock Whar.), Ga.	6·5	7·6	5·5
St. Augustine, Fla.	4·2	4·7	3·5
Key West, Fla.	1·4	2.3	0·7
San Diego, Cal.	3·7	5·0	2·3
Monterey, Cal.	3·4	4·3	2·5
San Francisco (north beach), Cal.	3·6	4·3	2·8
Astoria, Oregon Territory	6·1	7 3	4·5

In the preface to these tables, Professor Bache makes the following general remarks in regard to the tides on the coasts of the country:—"The tides of the coast of the United States on the Atlantic, Gulf of Mexico and Pacific are of three different classes. Those of the Atlantic are of the most ordinary type, ebbing and flowing twice in 24 hours, and having but moderate differences in hight between the two successive high waters or low waters, one occurring before noon and the other after noon. Those of the Pacific coast also ebb and flow twice during 24 hours, but the morning and afternoon tides differ considerably in hight, so much so that, at certain periods, a rock that has 3½ feet water upon it at low tide may be awash on the next succeeding low water. The intervals, too, between successive high or successive low waters may be very unequal. The tides of ports in the Gulf of Mexico, west of Cape St. George, ebb and flow, as a rule, but once in 24 hours, or are single day tides. At particular parts of the month, there are two small tides in the 24 hours. The rise and fall in these ports is small. East of Cape St. George the rise and fall increases; there are two tides, as a rule, during the 24 hours, and the daily inequality referred to in the Pacific tides is large."

AMERICAN NAVAL ARCHITECTURE.

[Reported expressly for the Scientific American.]

THE STEAMER "DANIEL DREW."

This fine steamer, having a very easy and a very superior model, has been erected with the view to attain a very high speed, and such are the sanguine expectations of those who are her builders, that they have made the assertion that she will beat the majority of the vessels of her tunnage in our waters. We deem it advisable, therefore, to publish the details of the construction of hull and machinery; they will be found annexed:—

Length on deck from fore-part of stem to after-part of stern-post, above the spar deck, 252 feet; length at load line, 245 feet; breadth of beam at midship section above the main wales (molded) 30 feet 6 inches; depth of hold to spar deck, 9 feet 4 inches.

Her hull is of white oak, &c., &c., and very securely fastened with rivets, treenails, spikes, &c., of appropriate diameter and lengths; her frames are molded 15¾ inches; the same are sided 4 inches, and distance apart at centers, 30 inches; the depth of her keel is 3 inches.

The *Daniel Drew* is fitted with one vertical beam condensing engine; diameter of cylinder, 60 inches; length of stroke of piston, 10 feet; diameter of water wheels over boards, 29 feet; material of same, iron; length of wheel blades, 9 feet; depth of same, 2 feet 4 inches; and their number 24.

She is supplied with two return flue boilers, each 29 feet long; their breadth at furnace is 9 feet; at shell, 8 feet; hight of same, exclusive of steam chimney, 9 feet 7 inches; number of furnaces, 2; length of grate-bars, 7 feet; number of same below, 10; internal diameter of flues below, 2 of 13½ inches, 1 of 13 inches, 1 of 11 inches and 1 of 7¼ inches; internal diameter of flues above, 9¼ inches; length of flues above, 22 feet. She has two smoke pipes, whose diameters are 4 feet; hight of same, above grate surface, 32 feet; draft forward, 4 feet 6 inches; draft aft, 4 feet 6 inches.

The boilers possess a heating surface of 3,350 square feet. Maximum pressure of steam, 35 pounds; point of cutting-off, one-half. Maximum revolutions at maximum pressure, 26. Her boilers are located in the hold; she possesses water-tight compartments, bunkers of iron, and one independent (extra size) steam fire and bilge pump, bilge injection, and bottom valves or cocks to all openings in her bottom. In addition to these features, she is amply protected from communicating fire by felt, iron tin, &c.

The builder of the hull of the vessel is Thomas Collyer; the builders of her machinery are the Neptune Iron-works; the route of her intended service is from New York to Albany.

AGRICULTURAL SCIENCE AND ART.

The water wheel is an exceedingly old motor, and, although the steam engine has proved to be the greatest mechanical agent of modern times, it has not, and never will, supersede the former for some purposes and situations. Where water-power is abundant and fuel dear, of course, a water wheel is the most suitable, because it is the most economical motor; and as it is with this water engine, so we have the same claims to advance for the old windmill. In such situations as extensive plains—where there is no water-power and where fuel is expensive—the windmill is a most useful motor, and may be economically adapted to circumstances. The *California Farmer* takes this reasonable view of the subject in regard to windmills for several sections of that great State, where fuel is dear and no water-power can be obtained. Their application for pumping water from low rivers to higher elevations and into reservoirs is recommended, so that it may be used for irrigation during the periodical drouths. This application of the windmill deserves attention, because it is founded on a good appreciation of its merits in such cases.

In reference to the benefit of agricultural machines, the *California Farmer* says:—"In an age of inventions of labor-saving machines, nothing has tended more to develop our national wealth than those contrivances which enable the farmer to increase the amount of the product per acre—to raise and convert into marketable condition a greater annual value of the means of life without a proportionate increase of cost or labor. Steam has indeed increased and cheapened the facilities for the transport of commodities, and, while it has opened new fields for labor, has also given us new markets for the product of labor. Printing has disseminated knowledge, and the electric telegraph furnished a lightning express for the conveyance of information that cannot wait the slow movements of steam or horse-power. But the earth is the primal source of wealth and power which sets all this machinery in motion; and, though it is said 'man cannot live by bread alone,' it is certain that he cannot live without it. Reaping machines have been of peculiar benefit to California, a country which can produce wheat enough to supply the continent, and which has now the prospect of a crop surpassing the product of Egypt, or the harvest which is annually shipped from the ports of the Black Sea. We cannot too earnestly impress upon our farmers the policy of being provided with good and reliable instruments of husbandry. Any other policy is 'penny-wise and pound-foolish.'"

The *Cincinnatus*, for last month, states that R. Peters, of Atlanta, Ga. (who is one of the persons that first cultivated the *sorghum* plant in this country, and who went into the business on a large scale for several years, under the sanguine expectations of ultimate success), has at last given up its cultivation. He is satisfied that, for cattle feed, its stalks are not superior to Indian corn, while its seed is injurious. As a producer of sirup, it will not compete with the common sugar cane in the South; but where fuel is plenty, in some of the northern States, it may be cultivated with economy for this purpose.

No crop can be more profitably raised for domestic animal feed than carrots and sugar beets. Horses are very fond of the former, and a few of them fed out every evening tend to keep the hard-working animals in good condition. About 30 tuns of this root may be raised upon an acre of well-cultivated land. Milch cows and sheep delight in sugar beets; it is a very healthy food for them, and should be cultivated by every farmer for this purpose.

MICHIGAN SALT.

If the sea were the only source for furnishing salt, the interior of our continent would perhaps be rendered uninhabitable. It has been far otherwise ordered, however, as there are found vast reservoirs of salt in the condition of saturated brine, extending over an extensive area in several States. These saline subterranean fountains are indications of a pre-arrangement for the supply of this useful agent, to a vast population, just as the great coal fields afford indications of a pre-arranged supply of fuel for the development and advancement of civilization. In the centre of New York, the salt springs of Salina are a source of State revenue, and they are essentially more useful than gold mines. In Pennsylvania and Virginia, there are also very many brine springs which afford salt for the people, and quite recently a very valuable one has been opened at East Saginaw, Michigan. The bore of this spring is only 3⅝ of an inch in diameter, but the supply is very abundant, as by continual pumping for 36 hours, drawing 22 gallons per minute, there was no sensible diminution noticed. The well is 617 feet deep, and a pint of the brine (by the analysis of Prof. J. G. Webb, of Utica, N. Y.,) contains 1416 grains of pure salt (chloride of sodium) and 32 grains of solid impurities. A bushel of commercial salt has been obtained from 23½ gallons of the brine. The East Saginaw Salt Co. are about boring another spring of 6 inches in diameter, and, no doubt, they will soon be able to supply a large quantity of this necessary article. In 1858, the New York salt springs yielded 7,033,000 bushels, most of which was sent to the North and West; no less than 1,669,000 bushels of it having been entered at the single port of Chicago. The discovery of salt springs in Michigan, therefore, is held to be of vast importance to the northwestern States.

THE MOTION OF A CANNON BALL.

The latitude of New York City is 40° 42′ 40″; and as the degrees of longitude diminish in length from the equator to the poles, the length of a degree of longitude here is about 52½ miles, or more nearly, say 277,250 feet. As the earth turns on its axis once in 24 hours it carries everything on its surface, from West to East, to the distance of one degree in four minutes; so that the city of New York, with everything else in this latitude, is constantly running round towards the East at the rate of about 13 miles a minute, or, more accurately, 1,155 feet in a second. Now, this is just about the velocity of an ordinary cannon ball. Hence, if a cannon in this latitude is fired when pointing exactly West at a fort, the ball is simply *stopped* in its eastern motion—the cannon *runs away from it*, and the fort *comes up against the ball* with a crash! This refers merely to the motion of the ball in relation to the diurnal rotation of the earth; if we attempted to ascertain the absolute motion of the ball, considering the motion of the earth in its revolution around the sun, and the motion of the sun among the stars, we should find the problem not only very complicated, but absolutely insoluble in the present state of astronomical science; indeed, it is impossible to conceive that we ever can have such knowledge of the universe as to enable us to determine the absolute motion of the sun in space.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, May 24th, the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city. At this meeting the appointed subject — "Gas-burning" — was brought upon the *tapis*, and the following is the gist of the

DISCUSSION.

Mr. Seely—Illuminating gas is composed of hydrogen and carbon, in varying proportions. Hydrogen, of itself, in burning, gives little light but great heat; carbon, also, in the act of burning, gives little light, but, being a solid, it may become red-hot or white-hot by heat. In the gas flame, the elements are separated; the hydrogen, as a gas, enveloping the particles of solid carbon. The hydrogen burns first, and by the heat of its burning the suspended carbon becomes luminous. Now, it is found, by experiment, that hydrogen in burning, with the heat from the carbon burning, gives out heat enough to render luminous all the carbon it can combine with; and it hence appears that the value of gas depends upon the proportion of carbon it contains. But gas may be so burned that very little of this value shall appear. If a flame be very small, it burns with a blue color of little light; in this case, the flame has a large contact with the metal of the burner, so that its heat is conducted away, the carbon is not heated hot enough and the combustion is not complete. In complete combustion, the products are water and carbonic acid; and, otherwise, carbonic oxyd and compounds of oxygen, hydrogen and carbon may be produced. When a flame smokes, gas is not burned economically, for the smoke is the valuable element of the gas going away without giving out its light or heat. Smoking is remedied by securing greater access of air, by spreading the flame to a greater surface, by chimneys, or by diminishing the pressure of the issue. If gas issues at too great pressure, it burns with a roaring noise, and gives little light, for the reason that the air mingles with the gas and consumes the carbon before it can give out its light. This is the condition in which gas burns in the "Bunson burner," and in many other contrivances adapted for heating by gas. The color of a flame is a good practical test of economical burning. A flame just at the point of beginning to smoke yields its maximum light, and at this point it is of a yellowish hue. Upon these principles, it is a simple thing to construct a burner which shall burn gas economically. Ordinary burners consume gas wastefully, for the reason that the access of air to the flame is too great; the gas issues with too great a pressure for the size and form of the flame. And if you turn off the gas to diminish the pressure, the flame will not be large enough. The simple remedy, then, is to enlarge the orifices and change their direction so as properly to spread the flame with little tension. We then have an economical light, but flickering, unsteady and liable to smoke, which objections may be partially remedied by the use of a spreader and a chimney. The first burner especially adapted to check the flow of gas was stuffed with felt; the felt was replaced with wire gauze, and, lately, sawdust is preferred to either. Instead of the stuffing, various contrivances have been introduced in which the gas is checked by compelling it to go through tubes, bent or winding, within the burner; and, last, there is the "Johnson burner," which checks by breaking the flow against a conical surface. All of these burners have wide orifices, and in these lie their merit; for the stop-cock is the place to check the flow.

Mr. Bogart—If the stop-cock will regulate and check the flow, people do not know it, and they will not use it for that purpose. But it is my experience that the same effect cannot be produced by the stop-cock as we get by the improved burner.

Professor Hedrick. Although yellow light is the most economical, it is not the most available. Its liability to smoke and its unsteadiness will unfit it for many people and places. Yellow light is pleasant enough to see by, as we found in North Carolina, where pine knots are much used.

The subject of "Gas-burning" will be resumed at the next meeting.

After the close of the meeting, the president remarked, in reference to the subject of "Expansion" (discussed at the previous meeting), that he had called at the office of the Erie Railroad Company and learned, from the highest authority, that no rails had been laid in actual contact on that road.

HOW TO MAKE IMPROVEMENTS.

The *American Railway Times*, in discussing the prejudices which seem to possess the minds of those who strive to make improvements, says:—"We know of no class of men who seem more unwilling to depend on one another than the master-mechanics of our railways. Of course, independence is a good thing—that is, within bounds. We have seen many a locomotive superintendent who wanted to adopt the improvement of his neighbor on another road, but who wanted first to invent it himself; and who would thus copy, as near as he could, the contrivance so as to not have it precisely the same—so near as to gain all that was to be gained by it, but not so near as to be called a thief; he will take the smoke-stack of a neighbor, but paint the top of it red where his neighbor's is blue—then he is an originator, and not a copyist. Some men in our neighborhood come to the designer of a successful 'coaler,' and say:—'My friend, tell me all about your improvement, just what it is, just what your experience with it has been; lend us your foreman, that he may introduce your plan *in propria persona* upon our road; and whatever you say is right, we will pay you for its use.' Now this is doing the thing up in the proper shape; the man who proceeds thus is a man, and is seeking after the truth wherever it is to be found; and he is the man who will save thousands of dollars to the company for which he works. But there is a class of men who come to the inventor or the improver, and get all the information they can out of him, and go away and partially digest and throw up from a diseased stomach an abortion which comes out as '*our* patent locomotive, which *we* designed in *our* shop;' but, somehow or other, when the thing comes up to be tried, it don't work; so cut and patch and alter, and try again; but it don't work; and so it goes, try and fail, try and fail, until your employers are disgusted with improved locomotives, and coaling is a humbug. These men seek not after the truth, but after *themselves*; and generally succeed not only in finding themselves, but in discovering themselves pretty essentially to others, also. Particular cases, illustrative of both of these modes of proceeding, we can put our hand upon with very little trouble; but we do not intend, just now, to particularize. We should prefer the master-mechanics to correct their own errors, and not to require to have it done for them, as forced correction from the outside is apt to fail in the desired effect, while self-correction from within removes the cause of error."

A NEW STEAM PASSENGER CAR.—A single car, called the *Novelty*, and propelled by an engine instead of horses, has been successfully tried on one of the Philadelphia surburban railroads. The engine has power for a speed of 30 miles an hour; the boiler occupies a vertical position on the front end of the car; the gearing, which in most of its parts is similar to a locomotive, is under the floor, and the water-tank (an iron pipe) is within the seats, which extend lengthwise along the sides of the car. The weight of car and engine, ready for service, is only 15,000 lbs. The engine has two horizontal cylinders, 5-inch diameter, 12-inch stroke; the car stands upon a pair of drivers, 3½ feet diameter, and a truck. The machinery occupies but 2½ feet of the body of the car, additional to the space occupied on the platform of horse-power cars by the driver. The car was built by Kimball & Gorton, and the engine by Baldwin & Co., of Philadelphia. For short lines, such a class of railroad carriages may yet supersede heavy engines drawing large trains. Being light, they will not require such heavy tracks, and a great number of them may be employed so as to run by steam, singly, at short intervals apart, as city railroad cars are now managed.

QUITE a quarrel is going on in the Paris Academy of Sciences with Leverrier, the discoverer of the planet Neptune. In the official almanac (*Connaissance des Temps*) which has just been published, there is no data concerning Neptune, and so Leverrier has brought up the subject in the Academy. Some of the members have indulged in what we would call "congressional personalities"—that is, their opinions of one another have been more pungent than complimentary.

A COLUMN OF VARIETIES.

A body falling only one foot strikes with a force eight times that of its weight.

The necropolis of Thebes, in Egypt (according to the calculations of Stevens), still contains millions of mummies.

Iron ships are now painted internally with gray oxyd of zinc, which affords better protection from rust than red lead.

A good baking powder is composed of 9 oz. bi-carbonate of soda, 8 oz. of tartaric acid and 10 oz. of rice or fine wheat flour.

There are 7,700 veins in an inch of mother-of-pearl. These decompose the rays of light and produce the prismatic colors.

Light comes from the sun at the rate of 200,000 miles per second; but sound travels at the rate of only 1,142 feet per second.

Fraunhoffer, the celebrated German optician, made a machine with which he could draw 32,900 lines in the breadth of one inch!

The "pitch" of a screw is the distance between two threads. In one revolution it will advance the exact distance of the pitch.

One pair of millstones, 4 feet in diameter and making 120 revolutions per minute, can grind five bushels of wheat to flour in one hour.

In the city of Pittsburgh, Pa., and vicinity, there are 25 rolling mills, which produce 100,000 tuns of bar, sheet and nail iron annually.

The shortest method of calculating the horse-power of engines is to use the unit of 550 lbs. moved one foot per second, instead of 33,000 lbs., one foot per minute.

Chloric ether is made by mixing one part of chloroform with six parts of rectified alcholic spirits. It is excellent for outward applications in neuralgia and toothache.

A circular saw, 2½ feet in diameter and making 270 revolutions per minute, will saw 40 square feet of oak and 70 square feet of spruce per hour per horse-power.

In a vacuum water boils at 88°. At the boiling point the vapor of water has the same density as the atmosphere; it is the same with all other vapors produced by boiling liquids.

Cast iron has been silvered, occasionally, by employing an excess of the chloride of silver in a cyanide solution of the metal, and otherwise pursuing the usual battery process.

An active man in the prime of life can raise 100 lbs. one foot per second, working 10 hours per day; a horse can raise 550 lbs. in the same space of time. These are units of horse and man-powers.

One gallon of water converted into steam will raise 5½ gallons of water at 50° up to 212°, which is the sensible heat of the steam; there are, therefore, 944 degrees of latent heat in the steam.

In man the temperature of the blood is 98°, in sheep, 102°. in ducks, 107°. During the chills of ague the heat of man's blood falls to 96° and 94°, while at the hight of fever it rises to 102°, and even to 105°.

The beautiful gloss of marble and alabaster is produced by rubbing it with a moist linen cloth and the powder of calcined tin. The finishing touch is given by rubbing with dry soft leather, or what is better—soft silk.

Baron Liebig has recently succeeded in forming artificial tartaric acid. It is said to be identical with the tartaric acid of nature, and that he has prepared the tartrates of soda and potash, and even tartar emetic, with it. This is a most important discovery in organic chemistry.

In America we have springs of salt water; in Cheshire (England) there are beds of red salt, 30 feet thick; in Poland there are salt mines extending for several miles in caverns, at a depth of 600 feet beneath the surface; at Cordova, in Spain, there is a mountain of salt 300 feet high; and in Peru there are salt mines 10,000 feet above the level of the sea.

The sheets of copper for sheathing ships are 4 feet long and 14 inches broad. The lower edges of the upper sheets lap over those beneath like clapboards on houses. The thicknesses of the several sheets used in the British navy are such that a superficial foot weighs 32, 28, 18 or 16 ounces. The thickest sheets are put on round a ship at the hight of the load water-line, and for about four strakes below; they are also put on the bows, down to the keel.

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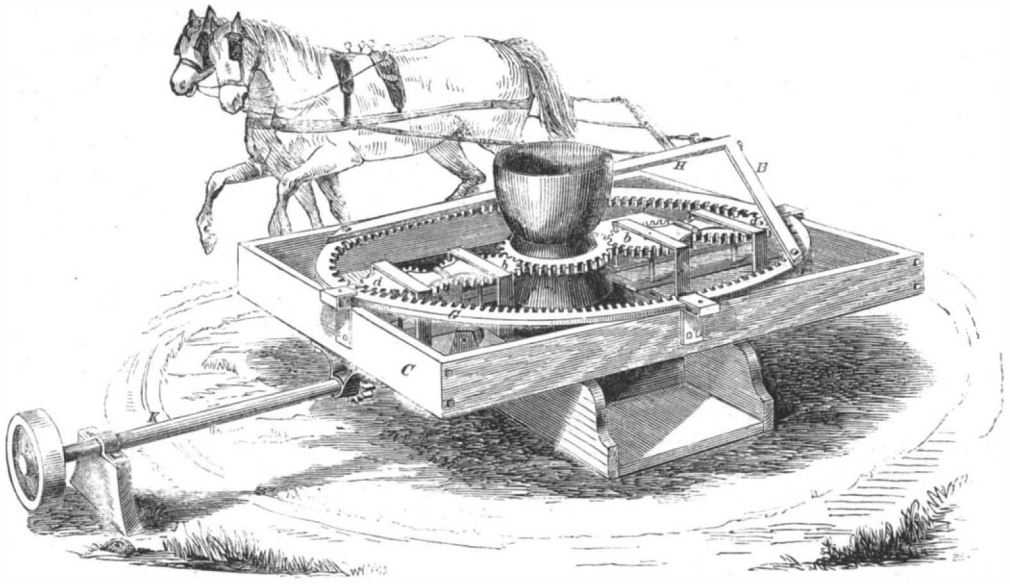
ORTON'S IMPROVED HORSE-POWER.

Inventions for the application of animal power promise to rival in number those for the application of the other two great powers made subservient to the use of man—steam and water, or, to go back to the original forces, heat and gravitation. The novelties in the horse-power here illlustrated will be readily understood by inspecting the cut.

A gear wheel, G, of the usual construction with teeth upon the inner edge of its rim, is properly suspended upon and between friction rollers in the frame, C. To this wheel are secured the sweeps, H H, at the ends of which, where they meet, the team is attached. Pinions, *d d*, mesh into the gears in the wheel, G, and these pinions mesh into the other two, *b b*, which drive the mill in the centre. When other work besides driving the mill is to be done, the shaft, K, is connected by a bevel gear with the shaft of the nearest pinion, *d*, and this is so arranged as to be readily thrown out of gear when the mill alone is to be driven. If, on the other hand, it is desired to run the shaft, K, and its connections without the mill, the bars or supports which confine the pinions, *b b*, are loosened, and turned back on the hinges carrying these pinions, over the pinions, *d d*. The advantages claimed for this horse-power are its compactness, lightness and the general convenience of its arrangements.



ORTON'S IMPROVED HORSE-POWER.

The patent for this invention was procured (through the Scientific American Patent Agency), on March 13, 1860; and further information in relation to it may be obtained by addressing the inventor, B. E. Orton, at Lyndon, Ill.

AN INGENIOUS DENTAL INVENTION—AN ARTIFICIAL PALATE.

Inventions which simplify the operations of machinery or add to the increase of manufactures are undoubtedly of a very beneficial character, but they do not afford such cause for congratulation as those which alleviate sorrow and relieve distress. An invention which provides for a bodily defect in any of our more unfortunate fellow-mortals is beyond all price and praise. We have lately had the pleasure of examining one of this character, which was constructed by Dr. Norman W. Kingsley, of No. 28 East Twentieth-street, this city, which consists of a very original and ingenious artificial palate that performs the functions of the natural one in a most surprising manner. To use plain language, let us suppose the case of a person having what is called a "hair-lip," and such a congenital defect that the roof of the mouth is open, devoid of a palate. In such a case, in attempting to speak, the voice will pass through the nose, just as it would through the broken pipe of an organ, and no well-defined sound or word will be produced. In speaking, we require some of the sounds to pass partially through the nasal passages and some through the mouth entirely, A natural palate possesses wonderful inherent power to slightly rise and fall to close and open the passages to the nose; it has also lateral contracting and expanding movements to direct substances from the mouth to the throat.

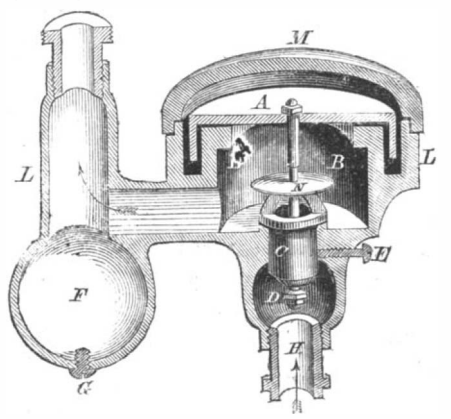
The artificial palate to which we have made reference was invented by Dr. Kingsley for a young lady who now enjoys the pleasures of uttering cultivated speech, while, prior to its application, she was unable to articulate distinctly, and had not the power to swallow without great effort. Her acquirement of speech is certainly a great triumph of mechanical and artistic skill. The front part of this artificial palate is composed of *hard* india-rubber, and the six upper teeth are set to it. This portion also forms part of the roof of the mouth, and the *velum* or soft palate is secured to it by a pivot, and it extends back like the natural one, which it imitates in all its functions. This part is composed of flexible vulcanized india-rubber, and it opens and closes the nasal passages and expands and contracts with perfect freedom, to direct the sounds out in speaking and the food back in eating. It has a flexible groove and bearings on each side, by which it dovetails, as it were, on the gums and in recesses above the jawbone, and it is very easily sprung into its place, to which it adheres gently but securely.

M. Delabarre, a French surgeon of distinction, constructed an artificial velum or soft palate of india-rubber about the year 1820, in which the use of laminæ of a flexible substance was first proposed; but after records speak of it as a failure. The only other notice of any similar attempt was the one made by Dr. C. W. Stearns, surgeon (now of this city), who went to London about 1842 to introduce his invention (*vide* "Harris' Principle and Practice of Dental Surgery"), who seems to have adopted Delabarre's principle, and met with better success from having a more perfect material. In the last case, the fissure under treatment was one of the soft palate, instead of being complicated with a fissure of the bones, the loss of teeth and a double hair-lip, as was the case which Dr. Kingsley had under treatment.

Any person having a congenital defect similar to that described, can now be provided with such an artificial palate. The invention of Dr. Kingsley has been examined by the most eminent surgeons and dentists of this city, and pronounced a complete success.

THE "STERLING" GAS REGULATOR.

Illuminating gas burns more economically, that is, yields more light to the square foot at a certain pressure than it does at any greater or less pressure. This is no mere supposition but has been positively ascertained, like almost everything else connected with the manufacture and burning of gas, by careful and thorough experiment. The proper pressure for the New York gas is that which



is exerted by about half an inch of water. As the pressure of gas at the burner is subject to constant fluctuations, from the varying pressure in the mains, from the constant changes in the quantity drawn through the pipes of any district, and from other causes, it is found necessary, in order not to have the gas extinguished entirely, to burn it at a pressure much above that which is most economical. In order to avoid this wasteful consumption of the gas, many efforts have been made to cause it to flow at a constant and proper pressure from the jet, but none of these have yet been generally introduced. We can see no reason why the regulator which we here illustrate will not accomplish the object perfectly.

The regulator consists of a case, L, inclosing the gasometer, A, the chamber, B, the movable valve seat, C, held by the set screw, E, the valve, D, and the mercury cup, I. F, is the dish or receptacle for water condensed in the pipes, and other impurities. The regulator is attached to the pipe leading from the gas meter by the coupling, H, and to the pipe leading to the burners by the coupling, I. In the mercury cup floats the gasometer, A, from which is suspended the valve, D, working upon the lower end of the valve seat, C, and set at such a point that sufficient gas at a proper pressure may enter to supply the burners. An increased pressure of gas elevates the gasometer, A, by which the valve, D, is raised, more nearly closing the valve seat, C, thereby diminishing the quantity of gas that would otherwise enter. The pressure being diminished, the gasometer and the valve seat fall, and the passage opens to admit the necessary supply of gas. It will be seen that the regulator is self-adjusting to the varying pressure of the gas, and affords a uniform supply to the burners and maintains a steady light.

Further information may be obtained by addressing the Wheeler & Wilson Sewing Machine Company, No. 503 Broadway, this city. An advertisement in relation to this invention may be found on another page of our paper.

LIGHT WITHOUT HEAT.

Great heat without much light is produced by the combustion of hydrogen gas; and this fact has been successfully applied in the arts to the reduction of metals. Still, we think that if the case were reversed, and great light produced without much heat, a boundless field would be presented for its application to the most useful purposes. In deep mines, for example, when the danger arising from explosions by common lamps is most imminent, this cold light would at once revolutionize the whole art of mining. Such a light could be employed in powder magazines, the holds of ships, and also in warehouses and manufactories containing combustible materials. Light and heat are different in their nature, and science seems to have settled the question that, under certain circumstances, they may be separated; but, for practical purposes, artificial light without heat has not yet been applied. The fire-fly emits a soft and beautiful light without its being apparently accompanied with equivalent heat. May not some mode be yet discovered for manufacturing independent light without heat, and rendering it applicable to the purposes we have pointed out?

In a lecture delivered before the Royal Society, London, by Professor J. Tyndall, F.R.S. (in November last), some very curious information was imparted on the phenomena of light. He stated that if a spectrum from the electric light was thrown upon a screen, it was to the eye what an orchestra was to the ear—the different colors were analagous to notes of different pitch. But beyond the visible spectrum in both directions there were rays which excited no impression of light. Those at the red end excited heat, and the reason why they failed to excite light, probably, was that they never reached the retina at all. These obscure rays were discovered by Sir Wm. Herschel.

GLOUCESTER, N. J., has become quite a manufacturing village. The Washington Mills, located there, are very extensive; hey present a frontage of 800 feet on the Delaware river; 650 persons are employed in them; they run 38,000 spindles and make 8,000,000 yards of cotton cloth annually. These mills are the property of Philadelphia merchants, and have been very successful. They were erected in 1858.

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VOL. II., NO. 24.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, SATURDAY, JUNE 9, 1860.

LIBERAL PRIZES OFFERED FOR LAMP IMPROVEMENTS.

WE present, herewith, the design of an antique lamp, which resembles the modern gravy dish now so common on our tables. We have no account of any mechanical contrivance of more ancient date than this for burning oil; and even as concerns this, the facts as to who was its original inventor, and what country had the honor of his birth, are mysteries which probably no Layard or Rawlinson will ever bring to light. That it did good service in its day and generation, no one can doubt; and its inventor—could his name be known—would be entitled to an honorable association with those who have won distinction in the fields of invention. The ancients were accustomed to ornament this species of lamp with a great variety of artistic designs; apart from this, it possesses no merit (except that of age) above the lamp now used by the Esquimaux to light his snow hut. The old English kitchen-lamp was the next improvement upon the antique. The beak was removed from the body of the lamp, and a tube was attached, extending some distance from it, in order to prevent the shadow cast by the flame from interfering with its illuminating power.

No great advance was made towards improving the oil lamp till 1789, when a Frenchman—Aimé Argand—took a step in the right direction and made an improvement which bears his name. He employed two metallic cylinders, one within the other; the space between them containing a cylindrical wick and a quantity of oil. The oil vessels surrounds the burner at some distance, and supplies this annular space by a tube. He also employed a chimney for exciting an artificial draft. This lamp is now so well known that a more minute description is not necessary. There is an immense variety of lamps now in use, and great ingenuity has been displayed in the application to them of physical and chemical laws. Since the improvement of Argand a great many inventions have been made for burning fish and lard oils; but of late years, or since the introduction of camphene and other burning fluids, and especially coal and cotton seed oils, inventive genius has been turned to the best contrivances for burning the latter class of oils, and the number of patents is *legion*. Several of these patents have been a source of great profit to their projectors. It seems, however, that the current of invention is about to be turned once more to *whale* oil, as will be seen by reference to an advertisement published in another column. A committee headed by Hon. Joseph Grinnell, and composed of the most respectable merchants of New Bedford (Mass.)—a place famous for the extent of its whale fisheries—are resolved not to yield to the rapid encroachments made upon their cherished interests by the introduction of new illuminating agents. There are whales enough in the sea, and there are ships and men enough to go out and capture them; but something more is wanted to give importance to the business, viz., the *inventor*; for with all our boasted natural advantages, no one is more necessary to their proper development; and the pecuniary inducement held forth in the advertisement alluded-to is one step taken on the right road to success. It will be seen that the offered prizes amount to $4,500, and should (as we doubt not they will) attract the attention and stimulate the inventive genius of many of our readers. The time for receiving the improvements which will be offered in competition for the prizes is set down for August 30th; and it is one of the conditions of the award, that *the improvements be secured by Letters Patent.* In this connection we volunteer a single word of advice to those who enter this "ring," to contend for the "champion's belt" in bloodless strife. Keep a careful record of your experiments by sketches and descriptions; and make oath to the *date* of your inventions; so that, in case conflicting questions about the right of priority should arise, you will be able to prove your date without the need of an attorney's services to worm out the facts in the case. Inventors are oftentimes —indeed they are generally—quite careless in this respect, and sometimes lose valuable patents for want of evidence to support their claims, which could have readily been prepared at the very time when the invention was first made.

A WORD TO OUR FRIENDS

The reader of the daily or weekly newspaper seldom takes into consideration the vast expenditure of time money and mental labor required to render it a success—indeed, these things can only be fully known to those upon whom falls the responsibility of their management. The sheet of paper which *you* now hold in your hand, before receiving the printed impression, costs only a trifle; but the aggregate cost of the paper for one edition of this journal, issued weekly, during one year, is nearly $30,000. The reader may infer from this that, when we undertook the enlargement of the SCIENTIFIC AMERICAN, one year ago, we did not enter upon it without considerable hesitation and anxiety for the future. The enlargement once made, there was no retreat; all we had to do then, as the soldier would say, was to "face the music." At that time we saw the certainty of a large increase in our expenditure, with no positive knowledge that our subscription list would increase in a ratio corresponding to the outlay.

We have now had a fair trial of our project throughout one year; our readers also, have had a chance to judge of the value of our exertions in their behalf; and hence, it is to them that we now address a few words. We are glad to say that, although our expenses during the past year have exceeded (by several thousands of dollars) the amount that we had anticipated, yet we consider ourselves well paid for this vastly increased outlay. We never worked harder in our lives to please our readers, and have never before expended so much time and money upon the paper as during the year past. These facts are fully evidenced by the greatly increased amount of original matter which we have published since the enlarged series commenced. The Editor-in-chief has had the constant aid of able assistants; and since the 1st of January, Judge Mason has frequently contributed able and valuable articles upon patents and patent law questions, in which our readers are more or less interested. Not only this, but we have had special reports of such transactions of scientific and mechanical societies as have transpired during the year, and which we believed would interest our readers.

On the first of July next we shall begin a new volume (the *third* of the "New Series") with unabated zeal. We feel our personal responsibility to our readers, and although a little relaxation from our heavy cares is very grateful, yet the "chair editorial" is seldom vacant. We cannot without doing injustice to our readers, transfer the responsibility of this position to other hands. Whether upon the rail-car or the steamboat, or at our post of duty, the interests of the SCIENTIFIC AMERICAN are never far from us. We have committed ourselves to the work of developing and pushing forward the prosperity of our common country—north, south, east, and west; and we intend to "keep on the harness," believing in the sound maxim that "it is better to *wear* out than to *rust* out." Our labors are not unappreciated; and we are grateful to our readers for it. We also owe many thanks to our courteous cotemporaries, all over the Union, for many friendly notices which have helped our circulation very materially, we doubt not.

The SCIENTIFIC AMERICAN has now a solid, influential circulation of about *thirty thousand copies per week*; besides a very large exchange list. In addition to this, the proprietors of this journal have under their charge *the most extensive Patent Agency in the world.* The advantages of this department to the journal are apparent —it draws from all sources the fruits of American and European genius, which are weekly illustrated in its columns; thus enabling us to spread out before our readers a complete original summary of the progress of invention and discovery. In direct connection with the paper and the Patent Department, 25 persons are employed in the capacity of editors, specification-writers and draughtsmen; while the printing and clerical force of the office numbers 22 persons. With this large and efficient force we shall enter upon the *sixteenth year* of our labors in conection with this journal; and we rely confidently upon our friends to sustain us. We commend to them the perusal of our new prospectus, published in another column, and we hope they will all endeavor, as heretofore, to enlarge the list of our subscribers.

OBJECTS OF INTEREST IN THE CENTRAL PARK.

One of the best places in the world to study geology is among the rocks of the Central Park in this city. One leaf in the record of the unmeasured ages is there laid open for the perusal of all who have learned the language in which it is written. The rocks which are in process of formation at the present time are of various kinds—lava which is being thrown out from volcanoes, deltas which are being formed at the mouths of rivers, salts which are being thrown-up by boiling springs, and sediment which is being deposited at the bottoms of lakes and seas. The last is in progress on by far the most extensive scale, and it constitutes the principal portion of all modern rocks, and indeed of all rocks, old and new. The modern formations occur in beds of very various extent, from the sediment which lines the bottom of a duck pond to the telegraphic plateau which stretches from the coast of Newfoundland to that of Ireland, and this is the case with the formations of all ages.

In all cases the rocks upon which the modern formations rest (and which of course must have been formed previously) are of somewhat different character from those which are now being deposited. In some of these the strata are horizontal, and in others they are bent and inclined at all angles by the tremendous power of the internal fires of the earth which heaved up the mountains from the bottom of the sea. In some cases the modern formations lie flat upon the sides of the earlier rocks, and in others they rest upon their upturned edges, and of course it is easy, by observing their positions in relation to each other, to determine the relative periods of their deposit.

The modern alluvial rocks are full of organic remains; and as we go down in the series we find the species, both of plants and animals, becoming less and less numerous, and less like the plants and animals now living upon the earth. The lowest rocks of all—such as granite—contain no organic remains, nor are they stratified, but they have a homogeneous crystalline structure. First above these primary rocks is a class of rocks the structure of which is both stratified and crystalline; and it is the general opinion of geologists that they were first deposited beneath the water, and then crystallized by the action of the heat. This change in their form has given them the name of metamorphic rocks. It is to this class of rocks that the very coarse gneiss (or stratified granite) of the Central Park belongs; therefore it is one of the earliest pages in the geological record, and it would weary the imagination to attempt to conceive of the immense period which has passed away since this formation was slowly deposited in successive layers on the bottom of the sea.

The mineralogist, too, will find the Central Park a fine field for exploration. The crystals of the gneiss are so large that fine specimens of mica, quartz and feldspar may be obtained, and same portions of the rock are almost filled with garnets.

We learn that the old arsenal in the park is to be appropriated to the use of the Lyceum of Natural History; and when these naturalists get their cabinet opened, the student will find it easy to turn from his shelves and books, and apply his lessons directly to the interpretation of nature. In this connection we have much pleasure in stating that a zoological society, composed of the most active men of our city, has been formed for the purpose of gathering at the great Central Park a superb collection of living animals and birds. This project ought not to fail, as its success will insure the existence of one of the most attractive features appertaining to this gigantic enterprise.

A few months ago the municipal authorities of Hamburg, in Germany, offered to forward a number of *swans*

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to our civic corporation, as a gift designed to add another feature of beauty to the many already exhibited in the Central Park. The offer was accepted; the swans recently completed their Atlantic voyage; and on the morning of the 28th ult., the cages containing the birds were conveyed to the edge of the skating pond and opened. On catching a glimpse of theelement in which they naturally love to sport, and of which they had been deprived since their departure from Germany, the swans eagerly rushed from their cages, and, entering the water, were soon floating majestically on its surface. At present their plumage is quite soiled—a result due, probably, to "a life on the ocean wave;" doubtless, it will soon regain its pristine purity, now that the birds have the free use of their favorite element. The swans are ten in number—five male and five female; they occupy the lower portion of the pond, while a number of beautiful white ducks occupy the upper portion.

AXES WITHOUT EYES.

The reading public of the United States has been entertained, at John Bull's expense, with a story about an English engineer who was so "stuffy" about his prejudices against American axes, that he sent to England a model of an ax of his own, with orders for some thousands "of that *exact* pattern." He did not think it necessary to cut an eye in the model, presuming that would be taken for granted as left to the maker to form in the usual way. The arrival of the large invoice of axes without eyes, and consequently useless, was duly chronicled and laughed at by a Montreal paper, from which we copied it; and from us most of the papers in the Union passed the tale around. The story has afforded so much fun to millions of our people, that it is not without some misgivings of the soundness of that philosophy which makes the exposure of untruth the highest virtue, that we prick the bubble and let out the gas.

We are advised by the officers of the Grand Trunk Railway, for whose use the tools were said to be ordered, that the whole story is a fabrication; and its object, probably, was to see if Yankee ingenuity would not contrive some use for axes without eyes, and bring "bids" accordingly. The fabricator of the *canard* was not disappointed in his expectation. Our Philadelphia friends are now manufacturing improved axes and other handled tools without eyes, under a patent obtained through the Scientific American Patent Agency, and which was described on page 268 of the present volume of the SCIENTIFIC AMERICAN; and their application to Montreal for the eyeless axes has revealed the hoax. Moreover, the Yankees will probably yet show "our Canadian cousins" that the truly scientific way to make picks and axes is without eyes.

THE NEW PATENT BILL PASSED THE SENATE.—On the 26th ult., on motion of Senator Bigler, [the new Patent Bill (a full copy of which we published, with editorial comments, on page 146 of the present volume of the SCIENTIFIC AMERICAN) was taken up and passed. That clause of the bill against which we contended—the abridgement of the right of appeal from the decision of the Commissioner—was (on motion of Senator Hale) stricken out. On motion also of the same senator, the power to appoint the Examiners-in-chief was taken from the Commissioner and lodged with the President, by and with the advice and consent of the Senate. Before this bill can become a law, it must pass the House, and receive the signature of the President. We may have occasion to refer to the bill again in our next issue.

ANOTHER COAL MINE EXPLOSION—VENTILATION.—An explosion of fire-damp took place at Stanton's mines, near Wilkesbarre, Pa., on the afternoon of the 31st ult. Three persons were killed, and one severely injured. Had this mine been properly ventilated, no such accident would have occurred. We take this opportunity of directing attention to an important article on this subject on another page, in which a description is given of the method of mine-ventilation by the steam jet.

The present volume of the SCIENTIFIC AMERICAN will close in two weeks from this date, and we hope those of our subscribers whose terms expire with this volume will be prompt in remitting their subscriptions for the next one; not only this, but that they will exert themselves to form a club, and thus avail themselves of our liberal clubbing rates.

WEEKLY SUMMARY OF INVENTIONS

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

WOOL-BURRING PROCESS.

In the wool obtained from South America, variously known as "Buenos Ayres," and "South American," there is almost invariably a burr of a peculiar character, all attempts at whose entire removal by machinery have hitherto resulted unsuccessfully, and the consequence has been that this wool, though otherwise of excellent quality, has only been used in the textile manufactures for goods greatly inferior to what would be made from wool of similar quality grown in the United States. The difficulty of removing the burr has arisen from its being composed of a rather brittle spirally-arranged bearded fiber, and when the wool has been subjected to the action of ordinary burring, picking, carding, or combing machinery, without previous preparation, this fiber has been liable to be unwound, and broken and distributed among the wool, to which its beard then clings with such tenacity that no picking or carding operation will remove it. This invention is more especially directed to the removal of the peculiar kind of burr above-mentioned; and to this end the nature thereof consists in subjecting the wool to a sufficient pressure, by passing it between loaded rollers or by any other suitable means, to so compress the burrs as to destroy their fibrous structure. This being done, the ordinary processes of picking, combing, or carding, or either of them, subsequently performed on the wool will either throw the burrs out entire, or cause them to crumble and fall out in dust or small pieces. The inventor of this improvement is Charles L. Harding, of Winooski Falls, Vt.

GOVERNOR.

The object of this invention is so to apply the governor in connection with the throttle or regulating valve that the necessary movement of the said valve may be imparted to it by the rotary motion of the governor, and not directly by the act of the change of the planes of revolution thereof, that such a movement may be effected very quickly, and that as soon as it has been effected the governor shall detach itself from the valve and remain detached therefrom till further action becomes necessary to regulate the engine or motor. The credit of this contrivance is due to George W. Rains, of Newburgh, N. Y.

SECURING TUBES IN TUBE SHEETS.

The object of this invention is so to apply copper or other soft metal in making the joints between iron tubes and the tube sheets in locomotive and other boilers, as to obtain cheaply all the advantages to be derived from its use, that is to say, the making of the joint perfectly tight, without exposing it to the action of the cinders passing through the tubes and thereby rendering it liable to be cut or worn out; and to this end the invention consists in fitting the exteriors of the terminal portions of the iron tubes with ferules of copper or other soft metal, so applied as to be interposed between the iron tubes and the sheets, and thereby to enable the joints to be made tight by caulking, but to be protected by the tubes. This improvement was designed by S. I. Hayes, of Chicago, Ill.

HEATERS.

The object of this invention is to employ steam for warming buildings at a pressure as much below that of the atmosphere, or as little above it as may be desirable, and at the same time to obtain an equal distribution of the steam to all parts of a heater or radiator; thereby obtaining a very considerable range of temperature in the use of water as a warming medium, and a uniformity of temperature of all parts of the warming surface; and to this end this invention consists in the admission of the steam to the heater or radiator by means of numerous perforations, very fine slits or other narrow openings so arranged as to deliver it into the heater or radiator at or very near the bottom thereof, and at all parts of its horizontal area, in very thin jets or streams, or, in other words, in a minutely divided state, by which its uniform diffusion throughout all parts of the interior and over all parts of the warming surfaces is obtained. This device has been patented to Lewis W. Leeds and Calvert Vaux, of this city.

SKATE ATTACHMENT.

This invention consists in an improved method of operating the sole and heel clamps so as to forcibly contract or expand them, either simultaneously or alternately, at one operation, and by a screw rod which passes through two straps or slotted plates, to which plates the clamping bars or plates are attached so that as the rod is turned the clamps on the sole plate will be made to approach or recede from each other by the slotted plate, and the action of the oblique or V-shaped slots on pins projecting from the clamps, and so also with the heel clamps after the forward clamps are tightened up. The patentee of this invention is John Lovatt, of Newark, N. J.

BARK MILL.

The object of this invention is to obtain a grinding mill by which damp or wet bark may be ground with facility, and in a perfect manner. There are many forms of bark mills which will grind, expeditiously and well, dry bark, but which will, when fed with wet or damp bark, become choked and clogged causing much trouble and delay, besides working very inefficiently, this difficulty is obviated by employing rotary burrs and stationary grates arranged in a novel way, and also in using in connection therewith breakers arranged to operate conjointly with the burrs and graters to effect the desired end. William Tansley, of Salisbury, N. Y., is the inventor.

DUMB-BELLS.

This invention consists in constructing the balls of any suitable number of sections, each of which may be secured together by a rod passing through the axis of the same, and connecting the two balls or nests of sections forming the balls together; and it consists in connecting the hemi-spherical or semi-spheroidal shells together in such a manner that each pair of shells may be brought together and made to form a perfect dumb-bell, or so that the outer shell may be filled up with one, two, or more smaller ones, and the whole confined in place; the balls being thus made up of large and small shells the lightest weight is obtained by using only the empty shells, while the weight may be gradually increased by filling-up the shells, one by one, with the sections. This improvement was designed by D. F. Savage, of Boston, Mass.

FIRE-ESCAPE.

Among the large number of fire-escapes which have recently been patented, the subject of this invention is one of the most effective, simplest and readiest means to save persons or articles from a burning building. It consists simply of a rope drawn through an S-shaped tube or wound around a pivot, or otherwise so arranged that the portion of the rope on the interior of said tube, or on the outside of said pivot, causes a retardation of the downward motion of the latter, which retardation is adjusted by the strain exerted on the rope, so that persons or articles attached to said tube or to said pivot can be lowered either by the agency of the descending persons themselves or by the agency of persons on the ground, with any desired velocity. This escape is of peculiar value for hotels or other buildings in which a large number of people dwell together, and it has been successfully tried in several hotels in this city. The credit of this invention is due to Albin Warth, of No. 19 Duane-street, this city, who obtained a patent for the same through the Scientific American Patent Agency.

ATTACHING BOWS TO KEYS.

In the construction of iron keys for locks, ornamental bows are frequently attached; the same being cast of brass or other metal that may be readily electro-plated, and forming an economical ornament. These bows have hitherto been most generally attached to keys by casting them on the ends of the arbors; but the contact of the melted metal with the iron causes the castings to be "blown" in many cases, thereby greatly deteriorating the work, and commercially reducing them in value. The brazing of the bows to the arbor, which might be done, would be attended with too much cost, as considerable manipulation would be required to perform the work. E. L. Gaylord, of Terrysville, Conn., has patented a mode of attaching key bows, which consists in "upsetting" the metal of the bows around a head or knob on the end of the arbor, whereby not only a firm and secure connection is obtained, but one that may be more expeditiously made than hitherto.

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ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING MAY 29, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

28,446.—H. W. Adams, of Brooklyn, N. Y., for an Improvement in Apparatuses for Distilling Coal Oils:

I claim, first, The use, in the distillation of coal, shale and other analogous substances, to obtain the oil and other liquid products therefrom, of a retort consisting of a pit dug or otherwise made in the earth, substantially as described.

Second, The construction of a retort for distilling oil and other liquid products from coal, shale, or other analogous substances, in a horizontal or slightly-inclined form, with a draft through it in a horizontal direction or parallel with the floor, and without a separate furnace, so that the charge may burn away gradually toward the outlet, substantially as described.

Third, The steam pipe, j, in combination with the eduction pipe, b, substantially as and for the purpose specified.

Fourth, Connecting the eduction pipe by which the condensed liquid products leave the retort with the main discharge pipe by which the vapors leave the retort, substantially as described.

[This invention consists in a certain construction of a retort and in certain improvements in the apparatus for collecting and condensing the products of distillation, whereby the distillation of oil or other liquid products from coal, shale or other analogous substances may be performed on a very large scale, in a more convenient and economical manner than has hitherto been practiced.]

28,447.—Wm. Adamson, of Philadelphia, Pa., for an Improvement in Machines for Picking Curled Hair:

I claim the employment of a brush feed roller made as shown and described, whether used in connection with another brush cylinder or feed roller, or in connection with plain or fluted rollers, for the purpose set forth.

[The object of this invention is to obtain a machine that will not break nor injure the hair or other substance to be operated upon, while picking or loosening the fiber of the same, in the process of manufacture for upholstery purposes—a result which occurs in a greater or less degree in the ordinary machines used for this purpose.]

28,448.—Luther Atwood, of New York City, for an Improvement in the Manufacture of Oils obtained from Coal:

I claim the production of thin oils suitable to be manufactured into illuminating oils, from the heavier parts of the crude and fixed oils and other substances within mentioned, by treating them in the manner substantially as described, during one or several continuous distillations.

28,449.—G. W. Brown, of New York City, for an Improvement in Ice-cream Freezers:

I claim a conical can in combination with a tapering dasher made to correspond with the can, substantially as described for the purposes set forth.

28,450.—J. D. Brown, of Cincinnati, Ohio, for an Improvement in Lanterns:

I claim the recessed floor, B C, formed with minute perforations over the entire surface of its upper portion, B, and the vertical sides, c, of the recess, in the described combination with the imperforate floor, A, apertures, E, and lamp, D—the whole being constructed and arranged in the manner and for the purposes set forth.

28,451.—C. L. Carter and Eleazer Jones, of New York City, for an Improvement in Coffins:

We claim, as a new article of manufacture, the coffin above described, the slabs being connected and secured together by grooves, in combination with unconnected angle irons and with the second or under lid formed of a glass plate, in the manner set forth.

28,452.—J. N. Chamberlin, of Troy, N. Y., for an Improvement in Sewing Machines:

I claim the construction, arrangement and combination of the catch or latch with the needle-bar, j, and the step bar, d, as herein set forth.

I also claim the needle-bar, j, constructed with two channels or grooves, s and t, crosswise of the same, in connection with the catch or latch, a or b, for the purpose of holding the said needle-bar in a certain position for a correct and working adjustment of the needle, l, as well as to hold the same upward and away from any interference of the materials to be worked, as described and set forth.

28,453.—J. H. Clifton, of New Castle, Pa., for an Improvement in Looms:

I claim, first, The combination of the jack-hook lifter with an adjustable mechanism for imparting to it a reciprocating motion, arranged substantially as described, so that the range of motion of the heddle may be changed as required, to vary the opening of the shed.

Second, The combination of a rockshaft and cam plate with adjustable cams, so arranged that by varying their distance from the center of the rockshaft, the range of motion of the rockshaft is changed and the shuttle thrown a greater or less distance, as required.

Third, The combination of the lay with a vibrating shuttle-carrier arranged substantially as described, so that the distance between the arms of the carrier may be varied to correspond with the distance the shuttle is thrown in passing through webs of different widths, substantially in the manner described.

Fourth, The combination of the lay with adjustable gulde rods for the shuttle, so arranged that their distance apart may be varied as required, in weaving fabrics of different widths at the same time, and also that their hight above the race board may be changed for fabrics varying in thickness, substantially as described.

Fifth, Arranging a cord or other material which is to be covered with a woven fabric, between the warps, and connecting it to an independent heddle which is so arranged and operated as to raise the cord with the upper leaf of the shed, while the woof thread is passing between the warp covering the under side, and depress it with the lower leaf of the shed while the woof is passing between the warps covering the upper side of the cord, substantially as described.

28,454.—H. A. Clum, of Auburn, N. Y., for an Improvement in Barometers:

I claim, first, The movable slides, D and E, with meteorological reading only, separate and detached from any graduations for vernier purposes, for summer and winter purposes, substantially as shown and described.

Second, The application of hights above sea level, of atmospheric pressure, &c., to the ordinary barometer face, as shown in Fig. 1, columns 1 and 2 on the bed-pieces, A and B.

Third, The cistern, as shown in Fig. 6, consisting of two or more chambers connected by stop-cocks at points above the open end of the tube.

Fourth, The entire cistern adjustment, as shown at H, Fig. 1, and N M R R S, Fig. 2, consisting of the connection of the vernier, I, to the cistern, which allows it to move with the cistern and tube, and also the movable cistern as fully represented in the drawing.

Fifth, The combination of two meteorological slides, D and E, for winter and summer purposes, to the ordinary parlor barometer, the cistern adjustment as described, with the cistern and further bottom adjustment, as shown on face, II, Fig. 1; all as fully and substantially set forth.

28,455.—L. O. Colvin, of Cincinnatus, N. Y., for an Improvement in Cow-milkers:

I claim, first, The extension legs formed of the tubes or hollow legs, a, containing the slides, b, in connection with the pins, e, attached to the springs, d, which are secured to the tubes, a, when the above parts thus arranged are applied to a bench, A, of the milking device described for the purposes set forth.

Second, The teat tubes, G, when made of conical form or taper form longitudinally, and of an elliptical form in their transverse section, to operate as specified.

Third, The combination of the teat tubes, G, levers, F, and the pump, the latter being constructed of the conical chambers, D, provided with valves, h, and the semi-cylinder, C, fitted on the socket, B; all being arranged as and for the purpose specified.

[This invention relates to certain improvements in that class of cow-milking devices in which pumps are employed for extracting the milk. The object of the invention is to obtain a device which will have all its parts very accessible for the purpose of cleaning, the implement permitted to be readily adjusted to cows of varying hights, and the device, as a whole, rendered extremely simple in construction and efficient in its operation.]

28,456.—H. H. Day, of New York City, for an Improvement in the Manufacture of Elastic Cloth:

I claim the new elastic cloth described, consisting of the stockinet goods and elastic gum so combined that two sheets of stockinet goods are connected by elastic gum, and the outer face of the fabric presents a gum surface—the said elastic cloth being a new article of manufacture.

28,457.—James Deally, of Louisville, Ky., for an Improvement in Keys:

I claim the combination of the slide, D, and spring, F, with the stem, B, in the manner shown and described, so that the key may be elongated when wanted for use, and closed up or shortened when not in use—all as set forth.

28,458.—T. W. Detray, of Montpelier, Vt., for an Improvement in Ferules:

I claim the ferule described, when closed at one end, and having an interior swell or projection combined with a wedge projecting inwardly from the closed end in the manner and for the purpose set forth.

28,459.—A. K. Eaton, of Brooklyn, N. Y., for an Improvement in Rendering Safes Fire-proof:

I claim the use of pure alumina, or the substances from which it may be produced, as hereinbefore mentioned and described, in the manner mentioned.

28,460.—W. H. Elliott, of Plattsburgh, N. Y., for an Improvement in Repeating Fire-arms:

I claim, first, The employment of a hammer arranged as specified in relation to the frame, in combination with chambers bored entirely through and left open at their rear end, and with a breech plate, as and for the purpose specified.

Second, The employment of a a movable exploding point for distributing the force of the hammer among the charges, so as to fire them in a certain order, when said point is employed with, but detached from a hammer, arranged as specified in relation to the frame.

Third, The arrangement of the head of the firing pin, r, in the central line or axis of the disk, p, so that a gliding blow from the face of the hammer upon the head of the firing pin shall have no tendency to revolve the disk, as specified.

Fourth, The employment, between the chamber, j, and the hammer, c, of a firing pin or its equivalent, when said pin is so arranged and employed with the hammer that, while it receives a gliding blow from the face of the hammer, it penetrates the cartridge in a direction perpendicular or nearly to the surface of the shell, as and for the purpose specified.

Fifth, The employment of a stop seat, b', in combination with main seat, b, when these devices are employed with an exploding point which penetrates the surface of the cartridge, as specified.

Sixth, The employment of disk, p, firing pin, r, in combination with a series of stationary barrels arranged around a common center, when these devices are so arranged that the longitudinal motion of the firing pin within the disk shall be parallel with the axis of the disk and with the bores of the barrels, or nearly so, as set forth.

28,461.—W. H. Elliot, of Plattsburgh, N. Y., for an Improvement in Repeating Fire-arms:

I claim, first, The employment of a hammer arranged as specified in relation to the barrels, when used independent of a breech pin or nipple, and in combination with chambers bored through at their rear end, and with a breech plate, as specified.

Second, The arrangement of support, n, in rear of all the barrels, and support, n', in front of all the barrels, in combination with a series of revolving barrels, when said barrels are bored through at their rear end for the purpose of being charged at the breech, as set forth.

Third, The employment of a hammer arranged and operating as set forth, in combination with a breech plate for resisting the recoil of the cartridge so as to relieve the breech plate from the pressure of the cartridge shell, as and for the purposes specified.

Fourth, The combination of wedge or cam, j, with fly, f, for raising the hammer as specified.

Fifth, The employment of lever, k, in combination with fly, f, as and for the purpose specified.

28,462.—J. W. Evans, of Forsyth, Ga., for an Improved Churn:

I claim the combination of the above mechanical arrangement with the grated dasher, sash, f, and set screw, i; the whole of the devices arranged as described for the purposes set forth.

28,463.—C. W. Felt, of Salem, Mass., for an Improved Machine for Setting Type:

I claim, first, The general arrangement and organization of the apparatus described, and for the urposes specified.

Second, Imparting the automatic motions described to the T's or their mechanical equivalents, by means of keys or indicators so arranged and operated that these automatic motions can be given at pleasure to one or more of the said T's or their mechanical equivalents, as set forth.

Third, The combination of the sliding pieces, L L, keys, H H, and vibrating bar, F, so operating together that the depression of the keys will actuate the T's, as set forth.

Fourth, Holding the T's or their mechanical equivalents in the same position in which they were sent by the action of the keys, so as to economize their motion, and whereby the keys can be operated quickly, several times in succession, without delay, by the arrangement of devices described, or any other arrangement of devices that will successfully accomplish the desired result.

Fifth, The arrangement of the series of holding hooks, q q, so operating as to engage with or be disengaged from the T's, and actuated for those purposes, substantially as described.

Sixth, The mode described of producing a registry or record of the T's, or of the work performed; the same consisting in forming automatically, by the action of the machine itself, holes, perforations or indentations in a strip of paper or other proper material, corresponding to the movements of the keys by the operator.

Seventh, The combination of the T's in the series of punches, operating in conjunction with each other, substantially as described, whereby the forward movements of the T will so actuate the punches as to produce holes, perforations or indentations in a strip of paper or other proper material.

Eighth, The arrangement of a series of needles or feelers so operated by, and in conjunction with, a register consisting of a strip of paper or other material, having holes, perforations or indentations formed therein, and so operating upon the T's, or their equivalents, that the same movements can be given thereby to the T's or their equivalents as those previously imparted by the operator on the keys for the purpose specified.

28,464.—Charles Fricke, of Mobile, Ala, for an Improved Cement:

I claim the described water-proof composition or mortar cement, for laying brick, stone, &c., compounded substantially as described.

28,465.—R. J. Gatling, of Indianapolis, Ind., for an Improvement in Machines for Breaking and Pulverizing the Soil:

I claim, first, A rotary share frame provided with shares capable of being adjusted to vary the depth of their cut, as well as to escape or pass over obstructions that may be in their path, substantially as shown and described.

Second, The employment of two sets of shares, K, attached to a rotating frame at opposite points of its shaft, to admit of the adjustment of the shares free from the ground when they are not required for operation, and thereby allow the machine to be readily turned and transported from place to place.

[The object of this invention is to obtain a simple, efficient and economical machine for breaking and pulverizing the soil, designed more especially for breaking prairie lands and pulverizing the soil of old farms, rendering the same in proper condition for the general cultivation of crops.]

28,466.—E. L. Gaylord, of Terrysville, Conn., for an Improvement in Attaching Bows to Keys:

I claim securing the bows, B, of keys to their arbors, A, by means of knobs or heads, c, formed on the arbors, grooved longitudinally and driven snugly into the sockets, f, of the bows—the parts of the bows at the ends of the socket being then upset to make the sockets snugly encase the knobs or heads, substantially as described.

28,467.—Albertus Geiger, of Dayton, Ohio, for an Improvement in Vapor Lamps.

I claim the combined arrangement of the vaporizing tube, B, as constructed, and the conducting or wick tube, C, together constituting an efficient hydro-carbon gas generator, with the globe-holder, D, by which the globe-holder is rigidly secured for use as described.

28,468.—W. A. Glidden and A. Starkweather, of Alvaretta, Wis., for an Improvement in Horse-powers:

We claim the sweeps, C E and D F, coupled in the center, and the braces, a b c d, and pulleys, Q R S T, when specially arranged and operating conjointly, as described.

28,469.—R. A. Goodenough, of Brooklyn, N. Y., for an Improvement in Horse-shoes:

I claim a shoe for horses and other hoofed animals, having upon its under side an indented ridge, as described, perforated for the insertion of nails at the rim of the shoe,

28,470.—F. T. Grant, of Gardiner, Maine, for an Improvement in Sliver Machines:

I claim the combination of the feed rolls, G G, operated by worms, H H, and cam, L, or their equivalents, and pressure bars, p p, for the purposes specified.

28,471.—S. S. Greene, of Rome, N. Y., for an Improvement in Shrinking Tire:

I claim the arrangement, as shown and described, of the jointed arms, B C, jaws, D D', rod, J, lever, F, and vise, G, for the purpose set forth.

[This invention consists in attaching peculiarly-shaped clamping jaws to pointed arms that are held by a curved guide rod, and in combining therewith a toggle lever and handle for operating the jaws so as to clasp the tire, and, at the same time, contract the tire while it is being held between the jaws of a vise to prevent it from springing during the operation.]

28,472.—O. F. Grover, of Middletown, N. Y., and H. L. Pelouse, of New York City, for a Tool for Mitering Printers' Rule:

We claim the attaching B to A, as shown at E E, so as to accommodate the motions of the lever and cutter in their performance, as set forth; the manner of adjusting C; also, F, in combination with G, for the purposes set forth.

28,473.—Loren Hall, of Milford, Mass., for an Improved Cushion for Horses' Feet:

I claim an elastic air cushion for protecting horses' feet, substantially as specified.

28,474.—Samuel Hall, of New York City, for an Improvement in Couplings for Shafting:

I claim the use or employment of the cross key, W, in combination with the longitudinal keys, E E, and slotted shafts, D D, said shafts being coupled within the box or clutch coupling composed of the sections A and B; the whole being arranged and operated as set forth and for the purpose specified.

28,475.—J. F. Holloway, of Saline Mines, Ill., for an Improved Steam Traction Engine:

I claim, first, The putting of the boiler, C, within a driving wheel or drum, D, when placed upon friction wheels or bearings within or upon said drum, substantially as described, so that the wheel or drum shall revolve around the boiler.

Second, The inner shell, B', of the driving wheel or drum, B, in combination with the stationary head, M, for the purpose of forming a tank, heater, condenser and jacket, substantially as described.

The object of this invention is to obtain a simple, economical and efficient traction engine, chiefly for ordinary use—such as the drawing of gang plows in the cultivation of land, or the hauling of wagons over prairies and our common roads, and for like purposes.]

28,476.—C. L. Harding, of Winooski Falls, Vt., for an Improvement in Facilitating the Removal of Burrs from Wool:

I claim subjecting wool, prior to its being submitted to the picking, combing and carding operations, or either of them, to a sufficient pressure between loaded rollers, or by means of other contrivancee, to destroy the fibrous character of the burrs contained in it, substantially as and for the purpose described.

27,477.—L. P. Harris, of Mansfield, Ohio, for an Improvement in Apparatuses for Clarifying and Evaporating Saccharine Juices:

I claim, first, The double filter, when constructed substantially as described, and its combination with heating and evaporating pans, substantially as and for the purposes set forth.

Second, An apparatus which affords facilities for heating, skimming, filtering and evaporating saccharine and other juices, substantially as described and for the purpose set forth.

28,478.—C. H. Hasker, of Portsmouth, Va., for an Improvement in Suspending Boats:

I claim, first, The bolt, i, eyes, j j, ring, h, as connected and arranged with the thimble, g, and the gripes, a a, operated as and for the purposes set forth.

Second, The roving of the one lowering and stopping fall, q, into the bite, t, of the other fall, whereby the lowering of the boat is done by one fall, as described.

Third, The hook, z, clamp, f', check lines, h', lever, i', with its bars and pin, as arranged, for holding and liberating the falls block, as set forth.

28,479.—S. I. Hayes, of Chicago, Ill., for an Improvement in Making Tube Joints:

I claim the ferule of copper or other soft metal applied to the exterior of the iron tube, between it and the tube sheet, substantially as and for the purpose specified.

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28,480.—J. M. Heard, of Aberdeen, Miss., for an Improvement in Pessaries:

I claim the construction of the pessary with its anterior side retreating upwardly to form a support to the bladder, and with its posterior side retreating upwardly to fit the hollow of the sacrum, substantially as described.

28,481.—Otto Heinigke and Moritz Laemmel, of Bay Ridge, N. Y., for Mosaic Veneers:

We claim, first, The within-described method of producing mosaic veneers from strips of any desired cross section, and of various colors; said strips being formed by pressing a suitable plastic material, which will harden after having gone through the whole process, through openings of the required shape, substantially as and for the purpose described.

Second, Uniting the strips, formed as described, into blocks, G, a cross section of which represents the pattern to be represented by the mosaic veneer, or a portion of the same, substantially in the manner and for the purpose specified.

[The object of this invention is to produce mosaic veneers, of any desired color, in a cheap and quick manner. This is accomplished by forming from a plastic material a large number of small prismatic sticks of various colors, which are united, according to the pattern or to the picture to be produced, into large blocks, which are now cut up transversely into a large number of veneers each of which shows the desired pattern.]

28,482.—J. C. Henderson, of Albany, N. Y., for an Improvement in Stoves:

I claim the air spaces, g, for a descending draft between the fuel hopper and combustion chamber, said draft entering the combustion chamber at the lower end of said air space, as set forth, whereby the descending draft keeps the hopper cool and enters the combustion chamber in a heated state, as specified.

I claim the combination of a hopper for feeding the fuel, with a cone, l, or contracted chamber (as seen at q), for detaining the products of combustion and retaining a sufficient heat for ensuring perfect combustion, as set forth.

28,483.—S. T. Holly, of Rockford, Ill., for an Improvement in Seeding Machines:

I claim the oblique supporting and driving wheels, B, applied to the machine, and arranged to operate substantially as and for the purpose set forth.

[This invention relates to certain improvements in that class of seeding machines which are designed for planting seed either in hills or drills. The invention consists, first, in the use of oblique supporting or driving wheels, so arranged that the same are made to cover the seed and press the earth thereon in a very efficient manner and in certain modified ways, as the nature of the case may require to favor the speedy germination of the seed; second, in a seed-distributing device, of novel construction, whereby the proper distribution of the seed is insured, and the clogging or choking of the distributing device effectually prevented.]

28,484.—Noble Hill, of Caton, N. Y., for an Improvement in the Manufacture of Pile Fabrics:

I claim the new article of manufacture described, constituting a fabric of wool, hair or other fibers, interwoven with a web of cloth, and treated with one or more coats of elastic varnish, with an exterior lining attached thereto, substantially in the manner and for the purposes shown and described.

28,485.—I. M. Hendricks, of Philadelphia, Pa., for an Improvement in Rice-hullers:

I claim, first, The arrangement of the hulling, the scouring the pearling, the polishing and the separating apparatus in one frame, substantially as described, for the purpose set forth.

Second, The combination of a layer of cork-wood with a layer of buffalo hide, with the hair on, for forming an elastic bed for an outer grinding covering of the hulling cylinder.

Third, I claim the combination of emery and metal filings cemented to duck, or equivalent material, for forming a grinding or rubbing surface.

Fourth, I claim combining, with the grinding surface, a narrow and wound spirally around the surface of the cylinder, when the ridge formed by the band is of less width than the space between the bands, and when the said ridge and depression are both covered with a material to form a grinding surface, for the purpose as set forth.

Fifth, In combination with a pliable grinding or rubbing surface, I claim an underlayer of buffalo hide with the hair on, for the purpose set forth.

Sixth, The combination of the two screws, revolving in opposite directions, and arranged substantially as described for the purpose of pearling the rice.

Seventh, The combination of buffalo hide, with the hair outward, with an underlayer of curled hair, for the formation of a polishing pad or brush.

Eighth, In combination with the polishing pad or brush, constructed as described, I claim a narrow band of cloth or other material, wound spirally around the brush from end to end, and arranged so as to form a depression or groove in the surface of the brush or pad, so as to act as a carrier and assist the brush in conveying the rice through the machine.

28,486.—Wm. W. Hubbell, of Philadelphia, Pa., for an Improvement in Breech-loading Ordnance:

I claim, first, The combination of the screw, c c f, the parallel gate shaft, j, and the gate, g, operating together, as described, so that the gate is moved forward without impinging on the parallel shaft, by the cylindrical front face of the hollow screw and back as it releases from the facing of the chamber when presented on the shaft to the screw.

Second, I claim the curved gate arm, q, the gate shaft, j, the gate, g, and the gate arm, r, together, in combination with the screw, c c f, and the bearing surfaces, l l and t t, of the recess and barrel, so as to conveniently raise a heavy gate of large guns by the leverage of the arm, r, on the shaft of the arm, q, and regulate the position of the gate in the recess, and with the barrel laterally and vertically, to receive the action of the screw, c c f, by means of the bearing surfaces, l l and t t, in the operation of loading, as described.

Third, The circular raised piece, h, on the back part of the gate, fitting into the central hollow, f, of the screw, so as to enable the screw to secure this gate so that it cannot be forced up, as described and shown.

28,487.—Allen Hughes, of Gratiot, Ohio, for an Improvement in Cultivating Plows:

I claim the shovel cultivator described, capable of both a lateral and a vertical adjustment, when made in the manner and by the combined arrangement described and represented.

[This invention consists in pointing the front ends of the shanks to the cultivator in such a manner that the shovels may be raised or depressed, and in fixing the shovels in the shanks carrying them rigidly to the beams by sector bars having pins passing through them and through the beams. It further consists, in conjunction with the mode of attaching the shovel shanks, in making these beams adjustable in the central beam, so that they may be contracted or extended, and, with them, the shovels.]

28,488.—Liveras Hull, of Charlestown, Mass., for an Improved Ratan Machine:

I claim, in combination with the splitting knife and the feeding mechanism, a mechanism for moving the feed rollers, F F, laterally, relatively to the knife, such mechanism for so feeding the feed rollers consisting of the actuator cam, S, and the slider, I, furnished with an adjustable arm, p; the whole operating and being operated substantially as specified.

And, in combination therewith, I claim a mechanism consisting of the stop cam, v, the lever catch, N, and its spring, y, or mechanical equivalent therefor, not only for stopping the operations of the lateral motion machinery immediately after the splitting of a ratan may been accomplished, but for stopping and holding the actuator cam of have such lateral motion mechanism in its proper position for the feeding and splitting machinery to commence action on another ratan.

I also claim applying the actuator cam and its stopping cam, or either, to the shaft, t, substantially as described, so as to be capable of revolving thereon, and providing the same with devices for producing friction, so as to cause the shaft to revolve the cam when the latter is not held or stopped by the lever catch and stop-cam, as described; such devices consisting of the cone, u, and the spring, w, or mechanical equivalents therefor.

I also claim combining with the slider, I, of the lateral motion mechanism, an arm, p, and its adjustable devices, arranged to operate substantially in the manner and for the purpose as stated.

I also claim the combination of levers, O P R, and the spring, c', arranged and applied together to the slider, I, and the shafts of the feed rollers, F F, substantially as and to operate as stated.

I also claim the arrangement of the strip guides, m and n, relatively to the knife and the set of draft rollers, G G.

28,489.—J. B. Hyde, of Newark, N. J., for an Improvement in the Machinery for Manufacturing Sheathing Felt:

I claim the apron, E, the composition troughs, F and 1 2 and 3, the apron and trough, G, the rolls, H and L, and the rolls, I, and the sand apparatus, K, arranged substantially in the manner and employed for the purpose set forth.

28,490.—John Johnson, of Naples, Ill., for an Improvement in Corn Planters:

I claim the combination with a divided frame, A B, of the adjustable or extension bar, J, jointed to the front part of the machine, and arradged in the manner and for the purposes set forth.

[This invention consists in a seed-dropping device arranged and constructed in a novel manner, whereby two rows of seed are deposited at one time and are brought so near the ground before they are dropped that, when it is desired to drop them, it can be done with precision and great regularity. The seed slide is formed in such a way that it can be readily adjusted for large or small grains of seed. The shoes for opening the drills are constructed so as to open the earth, drop the seed and cover it; the shoes and seed tubes being both made in one piece, and the seed tubes form standards. It further consists in dividing the frame of the machine—arranging the seed device on one frame, and the grooved pressing wheels on the other—and connecting the two frames together by a sliding coupling.]

28,491.—Ross Johnson, of Baltimore, Md., for an Improved Sash-fastener:

I claim the application of the described implement, c j i, as a permanent window-sash fastener, in the manner set forth.

28,492.—Permin Kopfer, of Fond du Lac, Wis., for an Improvement in Cooling and Setting Tire:

I claim the described cistern and revolving platform, the former being provided with a series of inclined planes, and the latter with a corresponding series of rollers; the whole being constructed, arranged and operated substantially as set forth, for the purposes specified.

28,493.—L. W. Leeds and Calvert Vaux, of New York City, for an Improved Steam Heating Apparatus:

We claim the admission of steam at or near and over all parts of, or a great portion of the bottom of a steam-heater, in numerous thin jets or streams; or, in other words, in a divided state, by a perforated pipe, or its equivalent, substantially as described, whereby an equable diffusion, in any quantity, may be effected through the whole of the heater, for the purpose specified.

28,494.—A. Leightheiser, of Reading, Pa., for an Improved Washing Machine:

I claim, first, The use of two rubber disks, with radially curved arms, constructed as described.

Second, I claim the center piece, J, furnished with hinged semicircular lids, turn latches, M, radially curved rubbers, E K, brace, B, and hand cranks, F H; the whole arranged and combined for the purposes as set forth.

28,495.—John Lovatt, of Newark, N. J., for an Improvement in Skates:

I claim the combination of the movable V-slotted blocks, E E', with the clamps, D D D' D', and the screw rod, G, when the same are arranged substantially in the manner and for the purposes set forth.

28,496.—Edwin May, of Indianapolis, Ind., for an Improvement in Window Grating for Prisons:

I claim, first, The platting of tubular iron, the tubes crossing each other at right angles, subsiantially as and for the purposes set forth.

Second, The bolting together of right angle tubes with the dovetail bolt, H, when the same is done for the purposes set forth; and—

Third, I claim the filling of said tubes with molten iron, in combination with the dovetail rivet, H, when all these parts and ingredients are used for the purposes described in the foregoing specification.

28,497.—John Mills, Jr., of Quincy, Ill., for an Improvement in Hemp Brakes:

I claim the rotary cleaning and beating beater, E', arranged over beater, E, when the same has also imparted to it a vibratory motion, by the arrangement substantially as described, or by any other suitable machinery, whereby a beating, and, at the same time, a forward motion is given to the hemp, as set forth.

[This invention consists in arranging in front of suitable feed break rollers, two beating or cleaning cylinders, one placed above the other, and the upper one (the speed of which is greater than that of the lower one) having a vibrating, at the same time a rotary, motion; the motions of the four cylinders are to be in such relation to each other that the hemp will be drawn out and kept straight to give the upper cleaning wheel a more efficient blow and to prevent the hemp from tangling. All the shaves are thus removed, and the perfect operation upon the hemp, before it leaves the machine, is insured.]

28,498.—J. C. Moore, of Peoria, Ill., for an Improvement in Corn Planters:

I claim the combination of the jointed bar with the operating cam and spring, arranged substantially as described, so that by bending the central joint, the bar is withdrawn from the cam, the discharge of the seed cut off and the movement of the slide to the seed box arrested.

28,499.—Wm. P. Parrott, of Boston, Mass., for an Improvement in Machines for Crushing Mineral Ores:

I claim the described combination and arrangement of one or more sets of crushing rollers, B B' C C', a sifting or screening apparatus, consisting of a rotary screen, S, and its case, b2, an air blast or blower, e2, and a discharging conduit, k, provided with a separator, h, so arranged that, by the conjoint action of gravity and a blast of air, the mineral matters may be separated from the refuse ore; the whole being for crushing ore and separating the metal therefrom, substantially as specified.

I also claim so combining the air-blast or fan-blower, e2, and the conduit, k, and its separator, h, that the said conduit and separator may be adjusted at any desirable angle of inclination relatively to the horizon.

I also claim so combining the rotary screen case, b2, with the fan-blast or blower, e2, and the conduit, k, provided with a separator, h, that the air blown through the conduit shall first be made to pass through the rotary sieve, substantially in manner and for the purpose as described.

I also claim combining a regulating air-hole, e2, and plug, or its equivalent, with the case, b, of the rotary screen, S, and with the fan-blower, e2, applied to operate therewith and with a discharging conduit, k, furnished with a separator, h, as specified.

I also claim combining the inclined screen, s3, of the rotary sieve case with the rotary screen, S, the regulating air inlet, e2, and the fan-blast apparatus, e2, its conduit, k, and separator, h.

28,500.—O. J. Pennell, of Williamsport, Pa., for an Improvement in Apparatuses for Renovating Feathers:

I claim the arrangement and combination of a steam boiler and air-heating device applied to the hollow rotating beater shaft, H, of a feather receptacle, H, substantially as and for the purpose described.

[The object of this invention is to obtain a device by which old geese feathers may be perfectly cleansed and renovated, so as to be equal to new ones, both as regards appearance and use. The invention consists in the use of a steam boiler, in connection with an air-heating device, applied to a hollow shaft provided with radial arms, perforated at their ends, and placed within a cylindrical box which has ventilating openings provided with flaps or doors; all being so arranged that the feathers, after being thoroughly steamed, may be dried rapidly by heated air, and while within the cylinder or box in which they are steamed, thus causing the cleansing and drying to be expeditiously performed at one operation.]

28,501.—Henry Powelson, of New Brunswick, N. J., for a Fire-escape:

I claim, first, The arrangement, on the top or in one of the upper stories of a building, of the sliding platform, A, in combination with the rising and falling car or basket, E, constructed and operating substantially as and for the purposes described.

Second, The combination, with the platform, A, and basket, E, of the hinged flap, G, substantially as specified, for the purpose of dropping the rope, F, as the platform advances.

Third, The arrangement of the rope, H, with its branches, S' S'', &c., in combination with the sliding platform, A, substantially as set forth, for the purpose of enabling the inmates of the house to control the apparatus from the several stories of the building.

[This invention consists in arranging, on the top of a building, a standing platform, in combination with a rising and falling car and with suitable chains or ropes, in such a manner that, by pulling one of the chains, the platform, together with the car, is brought to the edge of the building, and the rope which controls the motion of the car is dropped where it can be reached from any of the windows situated in the same vertical plane of the car or from the street, for the purpose of enabling persons to escape from any story of a building if every way of egress is cut off by fire.]

28,502.—G. W. Rains, of Newburgh, N. Y., for an Improvement in Governors for Steam Engines:

I claim the employment, in combination with a wheel, L, having teeth on a portion only of its circumference, applied in connection with the regulating valve, substantially as described, of two teeth or sets of teeth, f f and f' f', not forming continuous series on the governor sleeve, the whole arranged and operating substantially as specified.

28,503.—T. S. Ray and A. C. Rand, of Buffalo, N. Y., for an Improvement in Vapor Lamps:

We claim the generating cup, F, in combination with the vaporizing tube, D, and supply or aperture, d3, the same being constructed, arranged and operating substantially as set forth.

28,504.—G. W. Richardson, of New York City, for an Improved Steam Heating Apparatus for Warming Buildings:

An ascending steam pipe with siphons, constructed and arranged substantially as described, and with radiators, to which is connected a descending water pipe, the whole forming a continuous open circuit between the steam space and the water space of a boiler.

I also claim, in combination, first, coils, or their equivalent, for radiating heat into apartments; second, siphons, constructed and arranged substantially as described, and making connection between the ascending steam pipes and the coils; and third, ascending steam pipes and descending water pipes, each varying in area, substantially as specified.

28,505.—D. F. Savage, of Boston, Mass., for an Improvement in Dumb-bells:

I claim making the balls of a dumb-bell in hollow or solid sections, substantially as set forth, and thus rendering the same capable of being increased or diminished in weight.

28,506.—Wm. Scarlett, of Aurora, Ill., for an Improvement in Skates:

I claim combining the central stiffening bar or plate, D, with the two sheet metal halves, A, in the manner and for the purpose shown and described.

This invention consists in forming the stock or foot-stand with the heel-pin for preventing the foot from moving while on the foot-stand, and the slots and pins for holding the straps, and lastly, the runner or skate-iron, all with three pieces of suitable metal struck out into the desired shape, bent up and riveted together, so as to form, when put together, a perfect skate, with a groove or channel in the runner for preventing the same from slipping sideways while skating.]

28,507.—H. H. Scoville, of Syracuse, N. Y., for an Improved Machine for making Moldboards for Plows:

I claim the use of a conical forming block for shaping moldboards of plows when the same is so arranged with the pressure roller, constructed substantially as described, and framework, as to operate in the manner set forth.

28,508.—Frederick Shuttee, of Philadelphia, Pa., for an Improved Machine for Cutting Saw Teeth:

I claim the two revolving dies, composed of the disks, m and n, and having permanent angular projection and recesses, the projections of one die being adapted to and gearing into the recesses of the other die, as and for the purpose set forth.

28,509.—Reuben Shaler, of Madison, Conn., for an Improvement in Wheel Skates:

I claim the skate described, which, in the place of the ordinary runner, is provided with rollers, the periphery of which is made elastic, substantially as and for the purposes set forth.

28,510.—J. E. Shields, of Washington, D. C., for an Improved Butt Hinge:

I claim the side projection, C, on the connecting pin, in combination with the slotted ends of the segments, a a, and cavities, i i, in the leaves, arranged and operating substantially as and for the purposes set forth.

28,511.—H. K. Smith, of Philadelphia, Pa., for an Improved Sash-supporter for Car Windows:

I claim the combination, with the window of a railroad car, of the catch, C, and hook, D, constructed and arranged for conjoint operation in the manner described and for the purpose set forth.

28,512.—S. P. Smith, of Troy, N. Y., for an Improvement in Car Wheels:

I claim, first, Making the inner side of the rim, A, with a continuous mid-rib, d, and a cylindrical or slightly flaring surface at each side of the rib, and the peripheries of the supporting disks, F I, with shoulders, h h, and flanges, j j', as and for the purposes set forth; the said rim and disks being united together by means of compound band packing, k l k l, in the manner described.

Second, I also claim inclosing the elastic packing, r, when placed between the tightening device of the holding bolt and the body of the wheel, by means of a ring or recess, q, follower, S, and collar, t, all constructed and arranged together as described, so that, while the packing is left free to be compressed to any required degree, no part of the packing can be squeezed or worked out of place, nor pressed in contact with the holding bolt.

27,513.—Thos. Spencer, of Syracuse, N. Y., for an Improvement in the Manufacture of Common Salt:

I claim combining the carbonate or bi-carbonate of soda with common salt, substantially as and for the purposes set forth.

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28,514.—H. J. Spiller, of Cincinnati, Ohio, for Improved Roller Boxes for Printers:

I claim the ventilating roller box, as described, consisting essentially of roller chamber, B, water chamber, C, ventilators, d d e, sliding doors, G H, and vertical reels, consisting of stock, F, stationary head, D, and movable heads, C, all constructed and arranged substantially as and for the purpose set forth.

28,515.—Canceled.

28,516.—Lemuel Stephens, of Philadelphia, Pa., for an Improvement in Fertilizers:

I claim, as an improved article of manufacture, the "Phuine," made substantially as set forth.

[This composition is a very cheap and effective fertilizer, and it is successfully used as a substitute for guano. The various ingredients are so combined that the fertilizing qualities of the animal matter are retained and concentrated, and at the same time the animal matter is rendered more soluble and active.]

28,517.—Lee Swearingen, of Valley River Falls, Va., for an Improvement in Cars for Transporting Cattle, &c.:

I claim so hinging or connecting a series of partitions with a cattle car body, as that said partitions may be swung into a vertical position to form stalls or apartments to contain horses or cattle, or into a horizontal position for forming an upper and lower compartment for containing sheep or hogs, substantially in the manner and for the purpose set forth.

28,518.—Wm. Tansley, of Salisbury Center, N. Y., for an Improvement in Bark Mills:

I claim, first, The forming of the conical head, C, and rims, D F, of a bark mill, of eccentric sections, substantially as and for the purpose set forth.

Second, The grater, E, when formed of a series of alternate concave and convex sections, b* c*, as described.

Third, The crushing teeth, f g, formed respectively on the arms, a c', when used in connection with the head, C, rims, D F, and grate, E, and placed in the relation thereto, as and for the purpose set forth.

Fourth, The alternate long and short teeth or burrs, 1 2 and 3 4, respectively, on the rim, D, and conical head, C, as and for the purpose specified.

Fifth, The combination of the head, C, rims, D F, and grater, E, arranged within a case, A, for joint operation, substantially as and for the purpose set forth.

28,519.—J. R. Thomas, of Williamsburgh, N. Y., for an Improvemant in the Mode of Securing Lids on Gas Retorts:

I claim providing one end of the bar, D, with a double taper socket, d, and pivoting said end upon a pintle, c, so that said bar may be swung horizontally and also vertically upon the pintle, as and for the purpose shown and described.

[This invention consists in having a bar or hold-fast provided at one end with a socket, which is fitted on a pintle attached to the front of the retort at one side, the opposite end of the bar being fitted in a lock attached to the opposite end side of the retort, the bar or hold-fast having an eccentric connected to it at its center, and all so arranged as to form a simple and efficient fastening, and one that may be very readily manipulated for the purpose of securing the lid to the retort and detaching it therefrom without the possibility of one fastening interfering with the others in the same "bank" or furnace, each being allowed to be manipulated without being obstructed by the others.]

28,519.—John Thompson, of East Boston, Mass., for an Improvement in Locomotive Boilers:

I claim the improved smoke box, as so extended beyond the smoke current leading from the pipe-stack to the chimney, that the sparks or cinders discharged through the pipe-stack may pass out of and beyond the current of smoke, so as to be deposited in the box by the action of gravity and not be carried up the chimney.

28,521.—Thomas Towndrow, of New York City, for aa Improvement in Book-binding:

I claim the combination of the plates, A and A', tubes, B, and pins, C, constructed and arranged substantially as and for the purposes set forth.

28,522.—J. G. Treadwell, of Albany, N. Y., for an Improvemont in Stoves:

I claim the imployment of the corrugated or plain front plate, D, perforated as described, the close-fitting doors, E F, and slide, F, when used in connection with the double sides, G G', and the perforated air-chamber at the rear of the fire, substantially as and for the purpose specified.

28,523.—R. P. Van Horne, of Gratiot, Ohio, for an Improvement in Cultivators:

I claim the arrangement of the plate, A, draught bar, B, tooth or share bars, K, and truck or wheel bar, D, substantially as and for the purpose set forth.

I further claim, in connection with the plate, A, draught bar, B, share bar, K, and truck or wheel bar, D, the transverse bar M, provided with teeth or shares, N, substantially as and for the purpose specified.

[The object of this invention is to obtain a simple and cheap implement which may be readily adapted for the various kinds of work required in the cultivation of different crops, such as the eradicating of weeds, the pulverizing of the soil, and the plowing of the growing plants. The invention consists in a novel arrangement of tooth bars attached to a plate, the latter being connected to a bar provided with adjustable wheels, whereby the desired end is attained.]

28,524.—J. H. G. D. Wagner, of Paris, France, for an Improved Filtering Apparatus:

I claim, first, Removable horizontal shelves, p, the bottom and top surfaces of each of these shelves being provided with flanges on three sides, and the shelves being placed in relation to each other, as shown on plate 1, in combination with a steam-tight box B, water reservoir, A, and stop cock, o, substantially as and for the purposes set forth.

Second, Disks, m, provided with circular flanges on top and bottom with sockets, m', and central central holes, in combination with disks, n, provided with sockets, n', all the disks being placed in a steam-tight box, B, and in relation to each other, as represented on plate 2, substantially as and for the purposes set forth.

Third, Shelves, the top and bottom surfaces of each of which are provided with flanges on three sides, combined with a steam-tight box, B, and surrounding jacket, C', as represented on plates 3 and 4, substantially as and for the purposes set forth.

28,525.—Albin Warth, of New York City, for an Improved Fire-escape:

I claim, first, The arrangement of a tube, A or A', substantially as described, in combination with a rope, a, in such a manner that, by straining the rope, its friction on the inside of the tube is increased, and that weights attached to said tubes can be let down with any desirable speed.

Second, Arranging the tubes, A A', with a number of hooks, c, and loops, d, substantially in the manner and for the purpose specified.

Third, The combination with the rope, a, and tubes, A A', of a derrick, D, constructed of standards, i, hooks, j, lever, k, and cross-bar, l, substantially as and for the purpose set forth.

28,526.—Maximilian Wappich, of Sacramento, Cal., for an Improved Water Elevator:

I claim, first, Sustaining and buoying the screw elevator by a water chamber exterior to the shell of the screw, either in connection with the air-chamber or without it, substantially as described.

Second, Regulating the admission of the water by the lip, j', constructed and operated as described.

Third, The arrangement of means for suspending the upper end of the elevator set forth.

Fourth, The ring, e', and the means connected with it for packing and guiding the lower end of the cylinder, as described.

Fifth, The frames, b', as constructed and arranged and for the purposes set forth.

28,527.—J. B. Winslow, of Charlestown, Mass., for an Improved Machine for Cutting Moldings:

I claim, first, The combined action of the cams or guides, r, and the self-adjusting feed roll, h, or their equivalents, substantially as described.

Second, I claim the adjustable back guide, 8, acting with the cams or guides, r, and the feed roll, h, or their equivalents, substantially as described.

Third, I claim the connecting rods or wires, 15, or their equivalents, arranged in the machine substantially as described, whereby the action of the springs, x, is changed from the feed roll, h, to the compressure rolls, 12, for the purposes set forth.

28,528.—D. M. Woodin, of Brandon, Wis., for an Improved Churn:

I claim so arranging the two dasher shafts, which are provided with wings secured to them in a screw or spiral form, that by revolving one, the other will be revolved by it; the wings interlapping, pressing against each other and expressing the butter from the cream, as the bearings change from bottom to top, or vice versa, substantially as specified.

28,529.—S. W. Woodward, of Buffalo, N. Y., for an Improved Washing Machine:

I claim, first, The combination of the stationary tub, A, rotary shaft, B, and rotary disk, F, placed beneath and supporting the clothes—the whole being constructed, arranged and operated in the manner and for the purpose set forth.

Second, The spring rubbers, H, in combination with the revolving disk, F, substantially as set forth.

28,530.—W. C. Allison (assignor to Allison & Murphy), of Philadelphia, Pa., for an Improvement in City Railroad Cars:

I claim a seat composed of a series of transverse truss frames constructed and connected together as set forth, when the said seat is arranged on and combined with the arched roof of a railroad car in the manner and for the purposes specified.

28,531.—W. A. Bacon (assignor to himself and M. V. Reynolds), of Campello, Mass., for an Improved Machine for Skiving Counters for Boots and Shoes:

I claim the arrangement of the adjustable block, H, with the feed wheel, C, raised above the table, and with the knife, F, provided with adjusting screws, and supported by such block, as described.

28,532.—Albert Broughton (assignor to himself, Alexander Lindsay and J. R. Platt), of New York City, for an Improvement in Machinery for Grinding and Polishing Glass:

I claim the combination of the rotary, adjustable shaft, I, revolving disk, J, and independent pivoted disks, K K K, with the horizontally-reciprocating bed, C, and mechanism for effecting the intermittent oscillating motion of gear shaft, E, which reverses the movement of the traveling bed—arranged and operating in the manner and for the purpose shown and described.

28,533.—L. S. Chichester (assignor to F. S. Cabot), of New York City, for an Improvement in Filters:

I claim the combination, in the manner shown and described, of the plates, i h, and the filtering materials, with the adjustable plates, a d, when all the said parts are constructed substantially as set forth, so that by adjusting either of the plates, a d, filtered or unfiltered water may be obtained at pleasure, as specified.

[The object of this invention is to obtain a portable, simple and efficient filter, by which either filtered or unfiltered water may be drawn as required, by a very simple adjustment. For instance, when filtered water is required, for drinking or other purposes, water is made to pass through the filtering medium, and when unfiltered water is required, for washing or other purposes, the water is allowed to pass unobstructed and quickly through the filter case, thereby obviating, when not necessary, the comparatively-slow flow of the water caused by the obstruction of the filtering medium.]

28,534.—G. P. Dance (assignor to himself, J. H. Dance and D. E. Dance), of Columbia, Texas, for an Improvement in Hanging Millstones:

I claim the driver, D, provided with a taper, square opening, c, at its center, fitted in the runner, A, and resting on a rocking key, C, in the spindle—the latter passing through the taper opening of the driver, substantially as and for the purpose set forth.

[The object of this invention is to hang, by a very simple means, the runner of a pair of millstones in such a manner that it may, as it rotates, adjust itself to the position of the stationary stone, and the parallelism of the faces of the two stones be preserved whether the stationary one be perfectly horizontal or not.]

28,535.—T. G. Harold, (assignor to himself and James H. Harold), of Brooklyn, N. Y., for an Improvement in Guards for Key-holes:

I claim the blocking-piece, a, fitted on the bar, b, in combination with the sliding blocking-piece, c, that enters the key-hole, and prevents the piece, a, being turned, or picks entered into the key-hole as set forth.

28,536.—S. W. Lowe (assignor to himself, C. Wirgman and D. S. Johnson), of Philadelphia, Pa., for an Improvement in Vapor Lamps:

I claim the woven wire bag or case, B, the fibrous packing, D, and the wick, C, when the same are arranged and combined together in a lamp, substantially as, and for the purpose set forth and described.

28,537.—S. E. Pettee (assignor to the North-American Paper Bag and Envelope Manufacturing Company), of Philadelphia, Pa., for an Improved Paper Bag Machine:

I claim, First, Locating the rotating paster, F', so as to apply the paste directly to the edge of the paper, in forming the tube as set forth.

Second, Giving to the paster, F', a velocity corresponding with that of the edge of the paper on which it applies the paste, by means of the ratchet arrangement, operated as described, and for the purpose stated.

Third, The slide, Q2, constructed and operating substantially as and for the purpose specified.

Fourth, Feeding the tube of paper to the knife by the alternating operation of the reciprocating clamps, V V', as specified.

Fifth, The clamps, V V1 V 2, constructed as set forth, and operating them by darts and dogs, as described.

Sixth, Folder and paster, H, constructed and operating substantially in the manner stated.

Seventh, In combination with the paper-bag machinery, attaching the connecting rods which operate the slides and clamps to opposite crank centres, to secure a continuous feed of the tubing to the knife, as described and shown.

Eighth, and finally, I claim the general arrangement of the parts of the machine described, for performing the various operations of making the bags, in the order and manner set forth and shown.

28,538.—Hamilton Ruddick (assignor to himself and Jonathan Pierce), of Boston, Mass., for an Improvement in Sewing Machines:

I claim adjusting the length of the crank, e, by means of the slide, or its equivalent in combination with the feed lever, b, vibrating on the adjustable fulcrum, d, in order to cause said feed lever to pass a greater or lesser distance above the surface of the table or cloth plate, substantially as and for the purpose specified.

28,539.—Thomas Shaw (assignor to himself and L. N. Brognard), of Philadelphia, Pa., for an Improvemene in Furnaces for Burning Coal Oil or other Hydro-carbon Fluids under Steam Generators:

I claim the conveying of ignitable fluids to the interior of the fire-chamber, by means of a pipe surrounded by water within the boiler, substantially as and for the purpose set forth.

I claim saturating the air with vapors of a fluid, by means of the perforated tube, H, and its box, h, when arranged in respect to the fire-chamber of the steam boiler, substantially as set forth.

I claim the bars, n, and n, arranged in respect to the grate bars and fire-chamber, substantially as and for the purpose set forth.

28,540.—G. E. Vanderburgh of Mamoraneck, N. Y. assignor to the Liquid Quartz Company, of New York City, for an Improvement in Preparation of Soluble Silicates:

I claim reducing silicious substance to a liquid state by first incorporating therewith a small proportion of some alkaline substance and then subjecting the same to the direct action of super-heated steam whilst enclosed within a suitable vessel, substantially as set forth.

28,541.—G. E. Vanderburgh, of Mamaraneck, N. Y., assignor to the Liquid Quartz Company, of New York City, for an Improvement in Silicated Cements:

I claim a silicious cement prepared substantially in the manner set forth.

28,542.—Eldridge Weber, of Gardiner, Maine, assignor to himself, G. W. Wait, of said Gardiner, and N. B. Starbuck and G. H. Starbuck, of Troy, N. Y., for an Improved Marine Propeller.

I claim the construction of propellers with the two blades, B, B', as described, and placed at about an angle of 45° with the axis of shaft on opposite sides of a plane through said axis, and altogether forward of the rear extremity of the hub, substantially as set forth.

28,543.—George Nock, of Pittsburgh, Pa., assignor to T. G. Nock, of Windsor Locks, Conn., for an Improvement in Desulphurizing Coke.

I claim the use of a mixture of an oxydizing agent, such as peroxide of manganese, nitrate of potash, or other substanee, which yields oxygen, at an elevated temperature in contact with carbon, with an aqueous solution of chloride of sodium, or other alkaline chloride, or chloride of an alkaline earth, in the process of desulphurizing coke, in the manner described.

Also, The use of a mixture of peroxide of manganese or other substance which yields oxygen at an elevated temperature in contact with carbon and colophony, (or rosin), or other easily combustible substance, with an aqueous solution of chloride of sodium, (common salt), or other alkaline chloride, or salt of an alkaline earth, for the purpose of desulphurizing coke, in the manner described.

RE-ISSUES.

C. E. Bertrand, of Williamsburgh, N. Y., for an improvement in Sugar Mold Carriages. Patented March 30, 1858:

I claim, first, The construction and arrangement of carringes for the holding and conveyance of sugar molds; the same consisting essentially in the combination of a platform provided with a suitable train of wheels, of small diameter, for vertically supporting the molds, with a series of semi-circular braces, or their equivalents and guard chains or bars, for laterally holding said moulds substantially set forth.

Second, In sugar mold carriages, constructed as described with a brace plate arranged at a higher level relatively to the platform, I claim the two wheels running on or with one or two axles fixed to the platform, in combination with a swivel wheel, the shank or standard of which is made to bear against the said brace plate, whereby the carriage may be moved about with greater facility than this has ever been done heretofore.

Third, The combination and arrangement of stationary pins and india rubber washers, or their equivalents, in the platform, so that the molds when in position upon, and supported by the platform, shall have their drip holes closed by their own weight substantially in the manner and for the purposes specified.

Fourth, The general construction, combination and arrangement of sugar mold carriages as shown, and described, so as to operate substantially in the manner and for the purposes set forth.

W. F. Shaw, of Boston, Mass., for an Improved Apparatus for Heating or Cooking by Gas. Patented, Nov. 4, 1856:

I claim the combination of an air and gas burner, and an air guide or concentrator, G, operating in the manner substantially as set forth for the purpose specified.

I claim the flue space, X, around the chamber, H2, with its openings, Y and Z, operating as an air-heater when the oven is in place, and as a passage for the escape of the gases when other utensils are employed, as set forth.

ADDITIONAL IMPROVEMENT.

Charity Pendleton, of Galena, Ill., for an Improved Washing Machine. Patented July 12, 1859:

I claim the arrangement described of the bars 1, 2, 3 and 4, and the springs, 6, in the manner described, by which I am enabled to secure particular parts of the clothing with greater facility in such a manner as to concentrate the action of the rubber upon them, while at the same time the rubbing bar, which forms a part of this arrangement, is allowed to so yield by the compression of the springs, as to protect fine fabrics and delicate articles from injury as set forth.

EXTENSION.

T. W. Harvey, late of New York City, (H. A. Harvey, Administratrix), for an Improvement in Machinery for Manufacturing Wood Screws. Patented May 30, 1846. Re-issued Dec. 28, 1858:

I claim, first, The combination and arrangement of two inclined rollers, one or both rotating and placed at a sufficient distance apart to permit the shanks of the blanks to hang therein freely suspended by their heads, substantially as described, and for the purpose of arranging the blanks, (when presented in a promiscuous mass) all in a row with their heads up, and causing the row to travel toward the lower end, and to be delivered one by one as set forth.

Second, Combining with the delivery end of the inclined rollers or equivalent ways, for supplying the blanks in order, a delivery and check slide and a receiving and conducting tube, or equivalent therefor, substantially as described, to receive the blanks from the row, deliver them one by one, and conduct them to the place where they are required for after operations, and at the periods required as set forth.

Third, Combining with the receiving and conducting tube, substantially as described, a transferer or equivalent therefor, substantially such as described, to receive the blanks from the conductor, and transfer them to the mandrel or place where they are to be subjected to the cutting action, as set forth.

Fourth, Combining with the mandrel or spindle, and with suitable means for holding the screw blanks in line substantially as described, a sliding turn screw and spring, or equivalent therefor, substantially as described and for the purposes as set forth.

Fifth, Governing the motions of the chaser toward and from the axis of the blank, by combining the chaser head with a carriage and sway bar moved by a cam substantially as described, and also connecting one end of the sway bar with an adjusting slide, when this is combined with the chaser, or chaser head, as described, whereby the amount of taper to be given to the screw can be regulated at pleasure.

Sixth, Changing the direction of the various cam grooves, by means of sliding switches operated by sliding rods within the hollow cam shafts and shifted by an index cam, by which the various changes of the motions of the machine are effected substantially as described.

And finally, making the cam which operates the sway bar, adjustable on its shaft substantially as described, for the purpose of adjusting the motions of the chaser to the length of the blank, to insure the proper formation of the point of the screw, as described.

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Notes & Queries.

J. C. W., of Ill.—There are no obstacles to steam engines taking the place of horses for hauling on common roads, except the greater cost for machinery and expense in working. It is held as an opinion by several who have investigated the subject, that on almost any road which will pay for the expense and operation of a steam engine, a greater gain will ultimately be secured by laying down a track of rails. On any road well-paved with smooth blocks, we believe that a hauling steam engine could be operated with success.

P. A. W., of La.—Silver which is deposited on copper by the galvanic current simply adheres by the force of electrical affinity to the surface, and does not enter the pores of the metal like fire-plated silver. In soldering electro-plated copper or tin plates, the silver is liable to blister, because its heat-conducting power is different from the metal on which it is deposited. There is no way known to us for preventing this. If you should discover some method of cold soldering, you would secure the desired result.

J. O. G., of Mo.—The best black paint which you can use for engines is composed of boiled linseed oil and lampblack. After a coat of it has become perfectly dry on the metal, then put a coat of black asphalt varnish on the top of it, and a fine glossy surface will be obtained.

J. M., of Ill.—The best paint which you can use for a brick house, to prevent damp from striking through, is some mineral pigment of the color most suitable to your taste, mixed with good linseed oil. It is the oil, and not the pigment, which forms the protective coating. We have never seen a whitewash that would not ultimately come off with rain; but if you mix some skim or sweet milk, salt and a small quantity of molasses with lime whitewash (when cold), it will be rendered more durable than when used in the common manner.

J. P. L., of Va.—In Belgian coal mines, and some mines in England, as well as one or two in Pennsylvania, fans are employed for ventilating. You will find an article containing the description of a fan in an English mine on page 235, Vol. XII. (old series), SCIENTIFIC AMERICAN. Also, the description of a fan employed in a coal mine at Phœnixville, Pa., on page 267 of the same volume.

F. J. L., of Conn.—The statement to which you refer, regarding deodorized alcohol, was made at the meeting of the Polytechnic Association, and so reported in our columns. All crude alcoholic liquors may be purified by filtration through charcoal.

W. D. W., of Iowa.—Cast steel will stand a greater pressure than wrought iron, when made into a gun-barrel. We have heard of a rifle doing good execution at 1,100 yards. The leaves of the rhubarb plant are not poisonous, so far as we know.

A. P. C., of N. Y.—There is no power lost by the crank in a steam engine. You will find this subject illustrated and described on page 285, Vol. XIV. (old series), SCIENTIFIC AMERICAN. Also, on page 29 of the same volume.

E. T. A., of Ohio.—The shining yellow particles which you send us are mica, which may be known by its splitting into very thin scales.

C. T. M., of S. C.—The strings of your guitar, though called "catgut," are really made from the intestines of sheep, It is said that the "purring pussy" makes all her music before she dies. Why this article should have been called "catgut" has puzzled antiquarians to find out.

F. B., of N. Y.—"All the points in the perimeter of a wagon wheel rolling over a plane" do not "move with the same rapidity, at the same time."

R. C. B., of Ill.—Your article is received and will soon appear.

G. H., of Miss.—Your beer seed is being examined.

J. M. L., of Ind.—The substance which you send us is sand, composed of the ingredients of granite—mica, quartz and feldspar.

W. & S., of Va.—Various opinions are expressed in regard to the extent of surface which a lightning rod will protect. The rule has been laid down that it is a circle, the radius of which is equal to the square of the hight of the rod. We have never seen any account of experiments proving the correctness of this statement, and we have no idea that it has ever been determined. Probably it would vary with circumstances. We should venture the opinion, though not very confidently, that in the case which you cite there are points enough.

B. F. H., of Ohio.—Several plans are in use for consuming the smoke of furnaces, and, in England, there is a penalty attached to the escape of smoke from all manufactories, so that it must be consumed in all the furnaces of that country. By consuming the smoke of furnaces, a nuisance is abated and a considerable saving of fuel is effected. The common plan of burning, is to pass it over a highly-heated surface, and to provide a sufficient quantity of warm air for the perfect combustion of the carbon.

H. K., of Minn.—The velocity of a body falling one foot, near the surface of the earth, is at the rate of 8 feet per second; but the velocity of water passing through a notch, under one foot of head, is only 5.1 feet per second. As the velocities of falling bodies are as the square roots of the hights, multiply the square root of the hight of your fall by 5.1, and you will obtain the velocity of the water. Multiply this by the area of the opening, in square inches, and you will obtain the number of cubic inches of water which pass through in a second. As your weir-board is 2 inches deep and 48 inches wide, only 96 cubic inches will flow over it per second. We cannot recommend any wheel for your 2-inch fall.

C. C., of Texas.—You had better write to some scale-maker in this city for what you want. This is the best course for you to adopt. Address F. E. Howe, Jr.; he can furnish you with a good scale.

J. C. H., of Cal.—We have no recent information to communicate in regard to Dr. Collyer's straw paper.

G. W. T., of Mass.—It will be very easy for you to find out whether large and small shot, in quantity, and bulk for bulk, are the heavier. Take a pint of each and weigh them.

W. D., of Pa.—Your article is received, and is under examination.

J. A. J., of N. Y.—Oiled silk is manufactured by coating it with some quick-drying boiled oil, and drying it in a warm room. Two or three successive coats are sometimes put on, each being perfectly dried in succession.

J. P. S., of Ky.—You can get a copy of the drawing of Whitney's old gin from the Patent Office, we believe. It was patented in October, 1793.

S. S. R., of Tenn.—All the barrels of the best quality of double shot guns that we have examined were made in Birmingham, England. You can obtain a copy of Dr. Maynard's patent from the Patent Office; this is the only sure way of getting at the information which you want. Percussion caps and powder are made with fulminating mercury; also with chlorate of potash. Copal varnish for the caps is made by dissolving roasted gum copal in boiling linseed oil. The fulminate of mercury is generally mixed with some niter and sulphur for percussion caps. Ericsson engines of 10 horse-power have been constructed; they are about as heavy as a steam engine, boiler and all, of the same power. We do not know where you can obtain the teeth or springs used in music boxes.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, June 2, 1860:—

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A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront recues en confidence.

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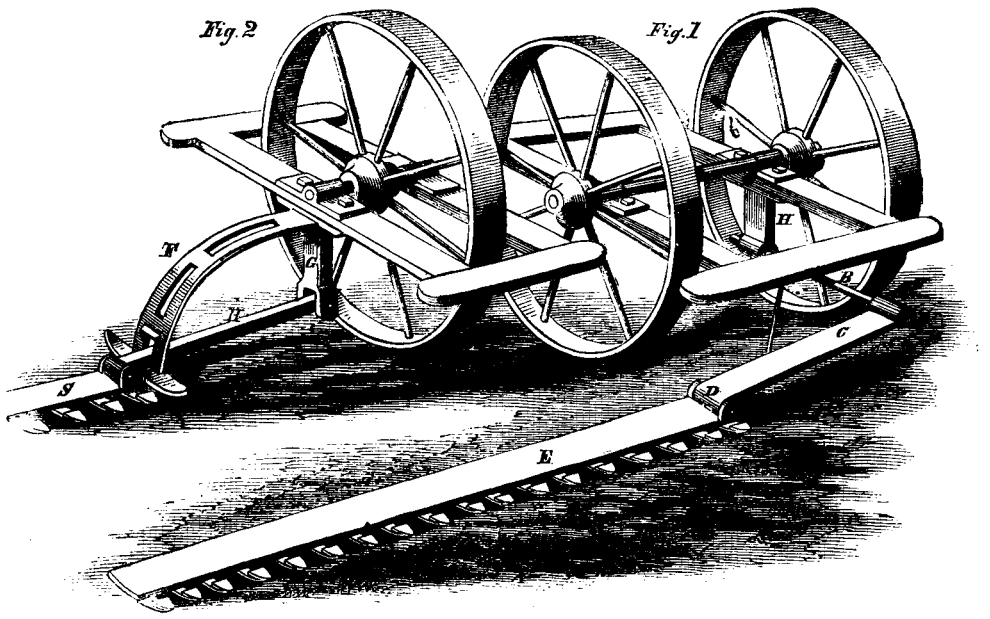
IMPROVED DOUBLE-JOINTED CUTTER-BAR FOR HARVESTERS.

The improvement in harvesting machines represented by the annexed figures is called the "double-jointed accommoding cutter-bar," and its object is to relieve the bar and frame of the machine from strain and side draft; also to permit a more perfect and easy accommodation of the cutter to the inequalities of the ground. The following description of the engravings will clearly explain how these results are secured by the invention.

Fig. 1 is a perspective view representing the accommodating hinged cutter-bar attached to the frame of a machine having two wheels, the ordinary parts of which do not require to be described. A is a hanging bracket secured to one side of the frame; in its lower end is a socket in which there is an arm, B, extending to the front end of which is attached the bar, C, connected by a hinge, D, to the cutter-stock, E. It is to be understood that the cutters receive their reciprocating motion by any of the usual modes of gearing.



BROWN & BARTLETT'S DOUBLE-JOINTED CUTTER-BAR FOR HARVESTERS.

Fig. 2 represents the improvement applied to a slotted bow-hanger, F, at the center of the carriage frame, which has but one wheel. A bracket, G, is suspended below, and the jointed bar, H, is attached to it and passes through a slot in the lower end of the bow-hanger. The slot in the latter prevents the bar from having any side or lateral play, but permits of any easy accommodating up-and-down motion. The cutter-stock, S, is hinged or jointed to the bar, H, as in Fig. 1.

The merits of this simple arrangement will be readily appreciated. The attendant can easily lift the cutter-stock over any obstruction, and also unhinge it (by drawing out the pin) with facility, and thus permit the machine to move unobstructed, like a carriage, through the fields or on the road. When the cutter-stock is rigidly attached to a connecting bar or shoe, as in some other machines, a lifting strain is exerted on the entire machine when the outer end of the cutter-stock is raised by any inequalities of the ground or by any obstructions. On the other hand, when the heel or innermost end of the cutter-stock is raised by an elevation of the ground, the strain is exerted to lift the entire cutter-bar. The accommodating jointed cutter-bar here represented obviates the side draft and the evils pointed out, for, as the outer end of the cutter-bar is passing over an elevation or obstruction, the hinge at the inner end permits the extremity to rise without strain, while the inner end is maintained in its proper position. When the inner end passes over an elevation, the joint also permits it to accommodate itself, without strain, to the inequalities of the ground.

The cutter-bar may also be attached to a flexible arm which embraces the same principle of operation. When the cutter-bar is attached to the center of the carriage frame, less vibration is experienced, as the different parts are thus more nearly balanced; but, for convenience, the cutter-bar may, in some cases, be placed in front, as in Fig. 1.

It is believed that some manufacturers are unwittingly infringing the rights of the patentees, and, with a view to promote the interests of all parties, we append the claim, so that each manufacturer may judge for himself upon this point. The patent was granted Jan. 2, 1855. The claim reads as follows:—"We claim hanging or hinging the bar, G, to the carriage, so as to vibrate substantially as described, in combination with the hanging or hinging of the cutter-stock to the bar, G, substantially as described, so that the cutter-stock may vibrate and accommodate itself to any undulations in the surface of the ground, and so that it may be raised by the attendant, to pass stones, stumps, or other obstructions, with out tipping the carriage." [See advertisement on another page.]

For further information address the patentees, J. E. Brown and Stephen S. Bartlett, at Woonsocket, R. I.

POLISHING SUBSTANCES—TRIPOLI.

Metals are polished, after they have been ground, by rubbing them with very soft earthy powder, such as impalpable calcined copperas, fine whiting, or tripoli. The latter substance has a high reputation for polishing brass, steel and other metals. It is a natural production, but is found in very few places, such as Bohemia and Tuscany, in Europe; New Hampshire, U. S., and lately at Port Hope, in Canada West. It is composed almost entirely of silica, and appears to have been formed of the skeletons of minute animalculæ. We have received some samples of this substance from S. Lewis, of Port Hope (C. W.), which appear to be of a very superior quality; being dry and free from calcareous earth.

Articles of brass, copper, steel and tin may be cleaned and polished with a paste of tripoli and sweet oil, rubbed on with a piece of flannel, then "finished-off" with soft leather. Lacquered and gilded articles are spoiled by frequent rubbing, and by acids and alkaline leys. A fine color may be given to brass ornaments, when not gilt or lacquered, with a little sal ammoniac, in fine powder, moistened with soft water. The articles must be afterwards rubbed dry with whiting. Another plan is to wash the brass-work with a strong liquor of alum (1 oz. to water, 1 pint); and after rinsing it in clean water and drying, to "finish it off" with fine tripoli.

THE MINOT'S LEDGE LIGHT-HOUSE.—This structure is situated in Massachusetts Bay, in such a position that it is exposed to the extreme violence of the Atlantic storms, and it has been found difficult to here erect a light-house which would stand. One was constructed of wrought iron under the direction of Gen. Swift, one of the ablest and most thorough engineers in the country, but it was destroyed in a gale, April 16, 1851. The present building is of stone, 30 feet in diameter at the base, and when completed will be 114 feet in height to the top of the pinnacle. It was commenced in 1857, under the direction of Capt. B. S. Alexander, of the Corps of Engineers, U. S. A., and is now nearly finished. A lithograph view of it, with vertical and horizontal sections, has been published by B. A. Frink, one of the draughtsmen engaged on the work.

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No person engaged in any of the mechanical pursuits should think of "doing without" the SCIENTIFIC AMERICAN. It costs but four cents per week; every number contains from six to ten engravings of new machines and inventions, which cannot be found in any other publication. It is an established rule of the publishers to insert none but original engravings, and those of the first class in the art, drawn and engraved by experienced persons under their own supervision.

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